amateur radio

Vol. 39, No. 7
JULY, 1971
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amateur radio

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*

Members of the W.I.A. should refer all enquiries regarding delivery of "A.R." direct to their Divisional Secretary and not to "A.R." direct. Two months' notice is required before a change of mailing address can be effected. Readers should note that any change in the address of their transmitting station must, by P.M.G. regulation, be notified to the P.M.G. in the State of residence; in addition, "A.R." should also be notified. A convenient form is provided in the "Call Book".

CONTENTS

COVER STORY

The Acitron SSB-400 Transceiver made in Australia. See write up of this hybrid unit on page 25.

FEDERAL COMMENT:

E.D.P. AND ALL THAT

In Singapore I was fascinated by the dexterity and speed achieved in the use of the abacus still to be seen in some of the older-style shops. The large beads on the wires inside the frame were flipped to and fro by agile fingers and in no time at all the whole of one's purchases had been calculated and totalled.

Our small shopkeepers write the amounts down on a paper bag or piece of paper and laboriously add them up, but at least one can audit it. I suppose one could audit the abacus method, but, although the various stages were explained to me, it still remains something of a mystery. These are, of course, one stage beyond the finger counting which goes on even today in parts of the world.

All this seems a far cry from the machines we use today. Everyone shopping in a supermarket will be familiar with the cash machines these people use and, if you value your pocket, how you must keep a sharp eye open on the cash read-out digits even though you get a tear-off strip from which you can subsequently make a check. These machines are themselves a generation or two ahead of the simple cash registers of yester-year where the old bell clanged whenever the handle was turned and the till was opened. However, the supermarket machines go further by enabling an analysis to be kept so that daily totals from different departments or classes of merchandise can be recorded and analysed. In addition, totals of cash and cheques can be read out at any time merely by pressing the appropriate buttons.

Finally, of course, the machine records every transaction on an audit roll within its entrails. A shop with one such machine would record a one line entry in the daily cash book split out into whatever categories is deemed necessary. Machines such as these are, of course, essential where pressures of daily business are quite beyond the scope of the old leisurely hand-written cash slips and where credit transactions are few.

The scope of these machines is limited to recording and totalling amounts. Something more is needed when a degree of memory is involved so, of course, electronic machines were developed. These mainly came out of the earlier mechanical punched paper card or tape systems which had been in use for data processing of various kinds where a print-out of the information was needed. After all it is no use having merely a visual read-out where the data is required for printing purposes or has to be circulated to one or more executives for study and evaluation. The development of magnetic tapes, bits and other advances in electronics were very rapid and even now we are only in second or third generation electronic computer systems.

Again, electronic data processing is of no value unless it can be put to use. It was, and still is, being discovered that the computer can perform a whole multitude of functions in double-quick time. So, although the machines are costly, they can supplant rooms full of people previously buried nose deep all day in Dickensonian ledgers. But they are only as accurate as the information fed into them. As a by-product, the computer is adding rapidly to the language.

In so far as we are concerned it has been calculated that programming the essential details of the members of one of our major Divisions into a computer would reflect a small financial saving. How much greater then would be the savings over the whole W.I.A. membership? The Easter Convention at Brisbane gave us the go-ahead for this work to begin. Each Division now possesses supplies of forms to record membership details. In the proposed central office of Federal Executive members' names are transferred onto a numerical system which will act as a key to the computer processing and these kind of lists will be kept under lock. There are many other safeguards being built into the system as well as a close look into costings.

When the whole of the membership details have been programmed into the computer it will then be possible, on pressing an appropriate button, to obtain a print-out of whatever information is needed. Who lives in Pymble, how many are over 60 or under 18, who live in post code area 7777, and so on. But, even more important, we could print out an up-to-date listing for the Call Book in about fifteen minutes whenever this may be required and also make the machine print out subscription notices analysed to any degree which Divisions require.

Note the emphasis on Divisional control. The machine is programmed with Divisional information. In so far as subscriptions are concerned, these are exactly as required by Divisions. Print-out will go to Divisions regularly so that the Divisional officers will possess regularly up-dated details of Divisional records. No more laboriously-maintained card indices and the like.

All this forms part of a greater degree of centralisation of records aimed at savings in costs without loss of Divisional control. These are major exercises which are now going on behind the scenes and which space precludes further elaboration. As members will have read elsewhere, when the new system has been finalised and polished up to everybody's satisfaction, annual subscriptions will have to come to Federal Executive offices for processing. It costs six cents to post a letter anywhere in Australia and only those who would normally pay cash subscriptions to their Division might be affected. But the whole of these changes are still being worked on, so please do **not** take it that the changes begin when you read this. We all aim for a beginning from 1st January, 1972. There are bound to be the usual teething troubles of course, but, judging by the amount of forethought going into the whole thing, these should only be of a minor nature.

—MICHAEL OWEN, VK3KI,
Federal President, W.I.A.

Novice Licensing—Some Important Correspondence

The following correspondence is self-explanatory. For details of the proposals suggested by the Committee appointed to investigate Novice Licensing see the "Federal Comment" in June "Amateur Radio".

* * *

11th June, 1971.

The Editor,
"Amateur Radio,"
P.O. Box 36,
East Melbourne, 3002.

Dear Sir,

A Special Meeting of the New South Wales Divisional Council was called on 11th June to discuss an article apearing in the June 1971 issue of "Electronics Australia".

Enclosed are copies of letters which were forwarded to the Australian Post Office Radio Branch and "Electronics Australia" subsequent to this meeting.

Would you please ensure that these letters are published in "A.R." at the earliest opportunity for members' information.

Yours faithfully,

The Council of the N.S.W. Division,
Wireless Institute of Australia,

A. G. MULCAHY, President.

* * *

11th June, 1971.

The Editor-in-Chief,
"Electronics Australia,"
12th Floor,
235-243 Jones Street,
Broadway, 2007.

Dear Sir,

The Council of the New South Wales Division of the Wireless Institute of Australia is deeply concerned regarding statements published on pages 132 and 133 of the June 1971 issue of "Electronics Australia" under the title "WIA ACTIVITIES" and we wish you to note that the Council completely dissociates itself from these remarks.

At no time was this Council consulted regarding the publishing of this material nor was the Council associated with or consulted about the preparation of the material allegedly broadcast by the Hunter Branch.

This Council wishes it to be clearly understood that:

(a) It gives no credence to the unsubstantiated accusations that P.M.G. and W.I.A. Officials have entered into collusive unofficial agreements as stated in the subject article.

(b) It at no time informed any person that "A motion suporting the concept of Novice Licensing for Australian Amateurs was carried unanimously by the Convention ..." as reported in the subject article.

(c) It believes that Post Office Officials will consider the introduction of Novice Licensing on the merits of the case presented if and when the Wireless Institute of Australia presents such a proposal.

(d) It is aware of the support offered by Dr. Dean Blackman for the proposal that the form of the A.O.C.P. Examination be modified to conform with modern procedures in relation to educational measurement and evaluation, and it believes that this article constitutes a most unjustified personal attack against Dr. Blackman.

(e) The opinions expressed in this article in no way represent the views of the N.S.W. Divisional Council.

The Council believes that the material printed on pages 132 and 133 has done grave damage to the relations existent between the Wireless Institute of Australia and Senior P.M.G. Officials. It has done grave personal injustice to Dr. Dean Blackman (one of the most dedicated Institute workers) whose views have been distorted and quoted out of context.

We sincerely regret that such a misleading article should have appeared in "Electronics Australia" which enjoys such a high reputation for accurate and truthful reporting.

We trust you will publish this letter in full in your next issue in order that your readers will know that the N.S.W. Divisional Council considers this article to be most inaccurate and misleading.

For and on behalf of,

The Council of the N.S.W. Division,
Wireless Institute of Australia,

A. G. MULCAHY, President.

* * *

11th June, 1971.

Controller Regulatory and Licensing,
Radio Branch,
Central Administration,
Postmaster-General's Department,
7th Floor,
Kings Parkade Building,
57 Bourke Street,
Melbourne, Vic., 3000.

Dear Sir,

The Council of the New South Wales Division of the Wireless Institute of Australia is deeply concerned regarding statements published on pages 132 and 133 of the June 1971 issue of "Electronics Australia" under the title of "WIA ACTIVITIES" and we wish you to note that the Council completely dissociates itself from these remarks.

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(b) It believes that Post Office Officials will consider the introduction of Novice Licensing on the merits of the case presented if and when the Wireless Institute of Australia presents such a proposal.

(c) The opinions expressed in this article in no way represent the views of the N.S.W. Divisional Council.

The Council of this Division regrets that material of this vein has been published such that it may be construed by readers as representative of W.I.A. policy and we have requested the magazine concerned to print a letter of rebuttal which we have this day forwarded.

We intend to ask the Editor of "Amateur Radio" to publish this letter and that sent to "Electronics Australia" in order that our members at least will be aware of this Council's action in this matter.

Yours faithfully,

The Council of the N.S.W. Division,
Wireless Institute of Australia,

A. G. MULCAHY, President.

* * *

7th June, 1971.

The Controller,
Radio Branch,
Central Administration,
Postmaster-General's Department,
7th Floor,
Kings Parkade Building,
57 Bourke Street,
Melbourne, Vic., 3000.

Dear Sir,

The Wireless Institute of Australia has for some time been giving serious consideration as to whether the introduction of some form of Novice type licence would be in the best interest of the Amateur Service in this country.

It was the policy of the Institute to advocate the introduction of such a licence until 1968 when the Federal Council decided not to continue to seek such a licence. I believe the last time the matter was raised with the Department was in 1965.

If after the present investigations are completed the Institute should decide to seek such a licence, I presume that the Department will be prepared to consider the matter in the light of the case as then presented.

I would refer you to the June issue of "Electronics Australia" (page 133) that suggests that a private agreement had been reached between "the repre-

sentative of the Federal Executive" and your office to "offer" a reduced Morse speed of 10 words per minute if the Institute dropped its claim for a Novice type licence.

I am concerned at the publication of such unfounded statements. I certainly have no knowledge of any such agreement either express or implied. Likewise, the suggestion of the existence of some agreement could perhaps be seen by some as a reflection on the integrity of officers of your Department as well as officers of this Institute.

Accordingly, would you please confirm, firstly, that it is also your understanding that no such agreement exists, and, secondly, should the Institute desire to raise the question of Novice licensing again, your Department would be prepared to investigate the matter with us. In order to avoid further misconception I contemplate the publication of this exchange of correspondence if that is agreeable to you.

Yours truly,

MICHAEL J. OWEN,

Federal President, W.I.A.

* * *

10th June, 1971.

Mr. M. J. Owen,
Federal President,
Wireless Institute of Australia,
Post Office Box 67,
East Melbourne, Vic., 3002.

Dear Sir,

I have your letter of 7th June, 1971, drawing the attention of this Department to an article published on page 133 of the June issue of the magazine "Electronics Australia" which mentions discussions between members of the Federal Executive of the Institute and the Department on the possibility of introducing a "Novice" type Amateur licence in this country.

I note that you are concerned that the article appears to suggest that a private agreement had been reached between the Institute's representatives and the Department for a reduced Morse speed of 10 words per minute if the Institute agreed to drop its claim for the introduction of a Novice licence and that your representatives have no knowledge of any such agreement.

In reply, I would like to take this opportunity to point out that I have caused enquiries to be made into this matter and there is no evidence in the Department's records nor is there any recollection on the part of any officer of such an agreement having been made with representatives of the Federal Executive of the Institute.

With regard to your further enquiry concerning this particular type of licence, it is confirmed that the Department would be pleased to examine any fresh proposals relating to Novice operators should the Institute seek to have the subject submitted for further consideration.

H. S. YOUNG,

Controller, Regulatory and Licensing.

THE VK2AAR SPECIAL ANTENNA

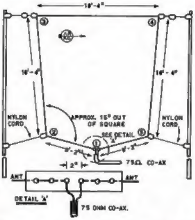
REG. C. STEELE, VK2AAR*

Here is an antenna that is **small**—you only need a minimum of 20 feet between poles.

Cheap—the components consist of approximately 75 feet of 7/20 copper wire; efficient—all reports during last contest 5-6 to 9, and average 5-8, out of 83 contacts—working only a few hours. Being both horizontal and vertical, it has a 360° coverage.

The s.w.r. of this beauty is 1:1 on 14 MHz. I have used it on 7 and 3.5 MHz., but the s.w.r. goes up to 2.5:1 and 3:1 on those bands. It is definitely a 20 metre antenna.

The sizes given are cut for 14.150 MHz. I have tried many wire antennas over the last 18 months, but have had nothing to compare with this one.



You will see by the diagram that the antenna is not quite square, so don't think it is bad drawing. The angle of the bottom section drags the sides in slightly. This bottom section is fairly critical and sometimes needs a bit of experimenting.

The method of construction is as follows:

Take the 75 feet length of wire and thread through the perspex insulator, leaving enough to connect to the co-ax. Measure 9 ft. 2 in. and wrap wire around insulator at 2, bind; measure 18 ft. 4 in. for horizontal section and again wrap around insulator 3, and bind. Measure 18 ft. 4 in. again and take to insulator 4 and bind, thence to insulator 5, and 9 ft. 2 in. to perspex and thread through three holes as at the beginning. Solder, or use connectors, to 75-ohm cable to antenna.

Hoist antenna to full height after attaching nylon strings to insulators 2 and 5. There is no set height for the antenna, but the higher the better—mine is between two 50 ft. poles, making the lowest section about 18 feet above the ground, allowing that the top has a slight sag in the centre, as my supports are 102 feet apart.

I do not use any balun or a.t.u., but feed straight to the pi-section of the Swan, through a six-section low-pass filter.

Should the guy wire go close to the antenna, make sure no length of guy wire exceeds 18 feet without an insulator. The same applies to the top support wires from antenna to support poles.

I am sure once you have tried this antenna you will scrap your dipole.

* 82 Greenwell Point Road, Greenwell Point, N.S.W., 2540.

☆

PROVISIONAL SUNSPOT NUMBERS

MARCH 1971

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa.

Day	R	Day	R
1	78	16	76
2	90	17	78
3	82	18	79
4	70	19	63
5	53	20	50
6	47	21	51
7	47	22	65
8	46	23	55
9	35	24	51
10	34	25	48
11	43	26	49
12	63	27	55
13	76	28	49
14	65	29	44
15	66	30	56
		31	53

Mean equals 56.2.

Smoothed Mean for Sept. 1970: 95.4.

—Swiss Federal Observatory, Zurich.

QUAD vs. TRIBAND YAGI*

COL. JOHN H. PARROTT, JR., W4FRU, ex-KA2JP

Clarence Moore, the inventor of the cubical quad, probably little realised when he and his associates were huddled over the reference books back in 1942 that the product of their efforts would receive such widespread acclaim and damnation as has been poured out upon the cubical quad antenna. The controversy continues with proponents and opponents switching sides as often as contest results are published. The purpose of this article is to contribute yet another bit of data to this controversy and to provide the neophyte and old timer alike an additional basis for applying the principles of cost effectiveness to selection of antenna systems.

While stationed in Japan, a sort of DX crossroads of the world, this writer had the opportunity to observe, first hand, the excellent performance of the cubical quad in competition with the yagi, dipoles and an assortment of other antenna systems. In pursuing this undertaking certain steps were necessary to insure that any conclusions made would be meaningful, and that they would be derived from sound data. With this in mind a plan emerged.

OBJECTIVES

In the many articles written on the cubical quad, it is noteworthy that only on a few occasions have the authors been privileged to compare the quad with other types of antennas on a real-time basis, and from the same operating location. Furthermore, when such comparisons were made, the authors generally compared against some type of monoband antenna system. A casual scanning of the 10, 15 and 20 metre phone bands would lead one to conclude that the triband yagi enjoys a rather high position of popularity among the antennas in general use. This being the case, it apeared that a worthwhile contribution to the data already available on the yagi and quad might be made by conducting a series of controlled comparative tests, employing the triband yagi and the quad. The test objectives were then defined: to compare various configurations of a cubical quad antenna with a representative commercial triband yagi; such tests to be conducted over short, medium and long transmission paths, and to arrive at conclusions regarding the relative merits of each antenna.

TEST PLAN AND PROCEDURE

Every effort was made to conduct the tests in a manner which would lessen the possibility of compromising the techniques employed by either the writer or participating stations:

(1) The test to be performed by establishing communications with Amateur Radio stations located throughout the world on a random and scheduled basis.

(2) Amateur Radio stations volunteering to assist in this effort to be briefed on conduct of test and data desired.

(3) A voice s.s.b. transmission to be made to the participating station, identifying the first antenna used as antenna "A".

(4) The voice transmission to be followed immediately by an unmodulated carrier for a period of approximately five seconds.

(5) The antennas would be switched, and a voice transmission be made identifying the antenna as "B", and the procedures above repeated.

(6) Particiating stations will note signal strength related to each antenna, and provide a numerical value as observed on his S meter or other indicating device. These values to be logged, and the test reinitiated with another volunteer station.

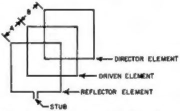


Fig. 1.—Element spacing information for Table 1.

EQUIPMENT PREPARATION

(1) Antenna heights to be as nearly identical as possible.

(2) Centre of antenna horizontal lobe patterns to be as nearly identical as possible when pointing the antennas toward a participating station.

(3) Resonant frequency of each antenna to be matched as closely as possible.

(4) Transmission lines to be matched to antennas and transmitter loading to be as nearly identical as possible with each antenna.

(5) Instantaneous transfer of the antennas.

(6) Relative power and s.w.r. to be monitored continuously.

(7) Prior to and after each data gathering session, equipment parameters will be verified. If a significant deviation in any parameter is noted, data collected will be discarded.

ANALYSIS

Antenna performance conclusions to be based upon an analysis of data derived from a minimum of 50 unmodulated-carrier observations with each antenna configuration, and supplemented with data gathered during conventional s.s.b. QSOs.

ANTENNA SELECTION

This writer had been using a four-element commercial triband yagi (boom length 24 feet, and 55 feet above the ground) for aproximately 1½ years, so the properties of this antenna were fairly well established. Furthermore, in on-the-air comparisons with competitive models of triband yagis in use by other U.S. Amateurs operating from the Tokyo area of Japan, the antenna appeared representative of commercial triband antennas in general use by the Amateur community. Therefore, the yagi in use at the author's station was selected as the reference antenna.

Text material concerning quad antennas, available to the author in Japan, was reviewed. It became evident that there are almost as many variations in quad design as there are writers on the subject. After much deliberation, and many discussions with Amateurs throughout the world, the decision was made to test three models of the quad (a fourth model was tested as will be noted later). Since the physical characteristics of the quad are fairly standard, only the dimensions of the elements and the spacing between them was considered. The dimensions for the three models tested were obtained from a Japanese manufacturer of cubical quads, from Orr's book, "All About Cubical Quad Antennas,"[1] and from Dr. J. E. Lindsay, Jr.,[2] W0HJ.

PRELIMINARY TESTING

Several days were spent "dry running" the test plan to validate the concept, and to smooth out the operating procedures and techniques. Of particular concern was the possible time required to make a valid data-gathering observation. If data were to be reasonably accurate, the transmission path had to be stable, and the signal strength observations must be taken on

1. Orr, "All About Cubical Quad Antennas," Radio Publications, Wilton, Conn.

2. Dimensions later published: Lindsay, "Quads and Yagis," "QST," May 1968.

	Model 1	Model 2	Model 3	Model 4
Reflector Element	72' 3"	70' 4"	72' 5"	72' 5"
Driven Element	69'	70' 4"	70' 5"	70' 5"
Director Element	—	—	—	69' 1"
Spacing "A"	7' 6½"	8' 5"	13' 4"	13'
Spacing "B"	—	—	—	13'
Stub	20"-30"	34"-38"	—	—

Table 1.

* Reprinted from "QST," February 1971.

each antenna during a short period of time. The dry runs were valuable in this respect.

A problem became evident during the first day of testing. It appears that those of us who speak and understand English do not always convey the same message when using the same words. As a result, it was necessary to modify the verbal format, utilising simple sentences and placing them in a logical sequence.

It also became apparent that the test could not be conducted under all transmission path conditions; that even under ideal conditions several observations were often necessary before a conclusive report could be compiled. It was decided to conduct the tests only on 20 metres. The operating time available to the writer favoured openings on 20 metres to Europe via the long path, and to Australia, the U.S. and various islands in the Pacific. It was also decided to orient the test antennas so that the topography and obstructions seen by each antenna would be essentially the same. (Physical separation between the two antennas was in the order of one wavelength.)

TESTING

Dimensions of the first quad model selected were furnished by a Japanese manufacturer of cubical quad antennas (see Table 1). The antenna was assembled, utilising commercially-manufactured heavy duty hardware and fibre glass spreaders. It was tuned to a centre frequency of 14,200 KHz. Testing of the first model began in November of 1967 and continued for a period of one month. The results for this period are given in Table 2.

In mid-December 1967, the first quad was replaced by a model constructed according to the formula and dimensions given in Orr's book. The results obtained with model 2 are contained in Table 2.

Construction of the third model (with wider element spacing) was carried out next. Two matching systems (Gamma and Q-section) were experimented with on this antenna. A satisfactory match could be had with either system. However, the Q-section was used for the test because it was the technique used with the previous two quad models (s.w.r. with each antenna was never more than 1.3:1 with a difference between antennas no greater than 0.1).

The results conducted with this model were most enlightening, as shown in Table 2. The model antenna was also used extensively during the first weekend of the 1968 A.R.R.L. DX Contest. Though these contacts were not used in tabulating test samplings, it is interesting to observe that openings to the U.S. (using the quad) lasted 15 to 30 minutes longer on each end of the period than with the yagi. It is assumed that this phenomena would also apply to each of the other quad models.

The fourth quad tested was a three-element wide-spaced model constructed according to more dimensions furnished by W0HJ. The results of the samplings were somewhat disapointing and are given in Table 2. (Frankly, the author felt that the three-element quad would show a substantial improvement over the yagi in every case.) The three-element model did appear to have a better front-to-back and front-to-side ratio than either the yagi or the other quad models. One positive comment: the three-element model is a monster to assemble and put up! In the author's opinion the difference in performance is not worth the small improvement. Perhaps, on the other hand, if one accepts the two-element model as the departure point between a simple mechanical structure and a major project, a four-element model might be more worth the effort. However, this is purely conjecture on the part of the author.

SUMMARY

The antenna tests indicate that:—

(1) One can expect to achieve the same or better results with a two-element quad of proper dimensions than with a three or four-element tri-band yagi.

(2) A wide-spaced quad will perform substantially better than a close-spaced quad.

(3) Dollar for dollar, the quad appears to be a better investment than a yagi.

ACKNOWLEDGMENTS

The writer wishes to thank all of the Amateurs who participated in the series of tests, and particularly the VK gang, who night after night tolerated the request for observations. The support couldn't have been better, and on many occasions, upon completing a check with a particular station, several other stations would call to give their observations (which were taken during the same transmission test).

	Model 1	Model 2	Model 3	Model 4
Total Observations	50	60	60	52
Less than 2,100 miles	12	2	3	3
2,100 to 4,800 miles	33	31	33	32
Greater than 4,800 miles	5	27	24	17
Signal Difference:				
More than 1 S unit better	—	—	—	—
Less than 1 S unit better	—	—	7	9
No discernible difference	1	5	51	43
Less than 1 S unit poorer	27	46	2	—
More than 1 S unit poorer	22	9	—	—

Table 2.

ANGLE MODULATION

LECTURE No. 14A

C. A. CULLINAN,* VK3AXU

Although there are no Frequency Modulated Broadcasting Stations in Australia, considerable use is made of f.m. in the broadcasting industry in link systems and wireless-microphones. Angle Modulation is used extensively in v.h.f. mobile services, Amateur services and is used for the sound transmission in Australian t.v., therefore a knowledge of Angle Modulation is needed by candidates sitting for a P.M.G. Certificate of Proficiency.

"Modulation" is the process by which the characteristics of an electrical wave are impressed on another electrical wave (carrier wave).

"Amplitude Modulation," as discussed in Lecture No. 12, means modulation in which the **amplitude** of a carrier wave is varied in accordance with an applied audio-frequency wave (in the systems in which we are interested) and the **carrier frequency does not alter** because of the process of modulation.

"Angle Modulation" is another method of modulation in which the phase angle of the carrier is the characteristic which is varied by the modulating voltage.

Frequency Modulation (f.m.) and Phase Modulation (p.m.) are particular forms of Angle Modulation.

One of the problems which exist with amplitude modulation is that practically all forms of electrical discharge as exist in nature (lightning is one such form) and the majority of man-made electrical discharges are in the form of amplitude modulation. As all amplitude modulation receivers are designed specifically to receive amplitude modulated signals they respond to both natural and man-made interference which is in the a.m. form and this is the reason we hear "static" and other types of interference sometimes when listening to a.m.

Both natural and man-made electrical discharges may cover a wide frequency range and may be detected from frequencies as low as 5 KHz.

Now the noise, whether from natural or man-made sources, which is picked up by an amplitude modulation receiver is proportional to the received bandwidth.

Therefore one method of reducing the effect of noise is to reduce the bandwidth of the receiver either by improving the selectivity or by reducing the upper audio frequencies after detection. However, both of these methods remove the high frequencies and reduce the fidelity of the reproduced sound.

Here in Australia all m.f. broadcasting stations can transmit musical tones up to 10,000 Hz. and in many cases can exceed this. Such music can be termed "high fidelity".

But if in a receiver either the selectivity or a "tone control" is adjusted to remove reproduction above 5,000 Hz., this may reduce noise but it will also cause poor quality reproduction.

As far as speech is concerned, the majority of telephone trunk lines transmit only a band of frequencies from 300 Hz. to 3.4 KHz. Speech on these lines is very intelligible but may not be natural due to the removal of the lower bass and higher audio frequencies.

* 8 Adrian Street, Colac, Vic., 3250.

• Continuing the series of lectures by C. A. Cullinan, VK3AXU, at Broadcast Station 3CS for students studying for a P.M.G. Radio Operator's Certificate.

This statement may not appear to be correct if one has been using a modern telephone and commented on its naturalness; however, the design of the receiver in the modern telephone handpiece is a triumph of electrical and acoustical research.

Sometimes man-made electrical noise may be a combination of amplitude modulation and frequency modulation, but in most cases it is the amplitude modulation form which predominates.

This state of affairs was realised many years ago and in attempts to overcome this, consideration was given by many inventors to a method of modulation in which the amplitude of the carrier would be held constant but the frequency would be varied by the modulating voltage.

However, this was not very successful because the attempt was made at m.f. broadcasting frequencies and the bandwidth had to be limited to that of a.m. broadcasting stations. In fact, the variation in frequency that could be obtained was very small.

HISTORICAL BACKGROUND

Now it may come as a surprise to many to learn that proposals for frequency modulation go back almost to the beginning of the century, long before the three-element valve was invented by Lee de Forest.

The first patent for frequency modulation known to the writer is Serial No. 785,803, issued on 28th March, 1905, by the United States Patent Office to Cornelius D. Ehret, his application having been lodged on 10th February, 1902.

It is interesting to note that Ehret proposed "to vary the natural period of oscillation (frequency) by changing the value of inductance, capacitance or resistance in the oscillatory circuit" and in one part of the claim states "the inductance is shunted by a telephone transmitter. Any variation in the resistance changes the frequency."

For many years a different form of f.m. has been used in radio telegraphy. Long wave transmitters used either a Poulsen arc or an Alex. Anderson h.f. alternator to generate, directly, a carrier wave. Because of the difficulty of starting and stopping such machinery for the dots and dashes of the Morse Code, keying was arranged to change the frequency of the oscillator. Thus the dots and dashes would be sent on one frequency and the spaces between on another frequency, which was known as the "back wave".

This method of radio telegraphy is used even today with high-powered valve transmitters to avoid the great load change on power supplies and power lines that would occur when keying a high-power transmitter.

In the early 1930's Major Edwin H. Armstrong, one of the U.S.A.'s great inventors in radio fields, gave consideration to the problem of developing a transmission system for music and speech, which would not be duplicated in nature.

In his investigations, Major Armstrong considered the use of frequency modulation and found that the only manner in which a wide audio frequency response could be obtained was to increase the transmitted bandwidth to a far greater extent than that used in normal broadcasting.

It was at this point where Major Armstrong demonstrated his genius because, whereas others had tried to develop f.m. for use in the already crowded U.S.A. m.f. broadcast band, he realised that the only way to make high-fidelity f.m. a success would be to go to the very high frequency portion of the spectrum where the use of a wide-bandwidth would not be a problem.

The feasibility of this was confirmed by construction of a low-power phase modulated v.h.f. Amateur band transmitter and carrying out transmissions on Amateur frequencies.

Tests with this transmitter were so successful that Major Armstrong built a high powered f.m. transmitter, using phase modulation.

This transmitter was installed at Alpine, New Jersey, U.S.A., and used the call sign W2XMN. The aerial was a 16 element turnstile, 900 ft. above the Hudson River and produced approx. 20,000 watts at a frequency of 42.80 MHz.

A very large number of tests were made on this station and these proved that Major Armstrong was on the right track because clear reception was possible during thunder storms which blotted out more powerful a.m. signals, and in many circles f.m. was hailed as being the end of normal a.m. broad-

casting because of its freedom from noise and its far better quality of reproduction.

It may be as well to interpolate some comments here: As this is written in 1970, high quality f.m. has been in existence for about 35 years, yet today there are approximately 3,000 a.m. broadcasting stations in the U.S.A. alone. Somewhere about 1,500 of these do not operate at night and the most popular transmitter is the 1 kw. size.

Now in the U.S.A., due to the great number of m.f. a.m. stations, night time interference between them is at a very high level and because of this, many are restricted to the bandwidth they can transmit. Some must cut off all audio frequencies above 1½ KHz.

In Europe, stations are spaced at 9 KHz., and all stations remove the audio frequencies above 9 KHz. This means a reduction in the upper frequencies that can be transmitted.

Also, it must be realised that in many of the larger cities of the U.S.A. man-made interference has always been at a far greater intensity (level) than in Australia so that even in the early 1930's noise was a major problem in broadcasting in U.S.A., this being aggravated by the low power being used by many stations. Another matter to consider is that natural noise or static appears to be more dominant in the Northern Hemisphere than in the Southern.

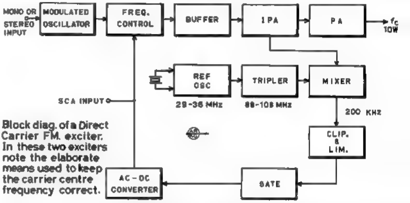
These comments still apply in 1970 and the writer feels that it is a perfectly valid statement to make that in the majority of cases m.f. a.m. broadcasting in Australia is technically superior to that in North America and Europe.

Here in Australia we are more fortunate as the Australian Broadcasting Control Board requires a frequency response of ±2 dB. over the range of 50 to 10,000 Hz. for a transmitter. The A.B.C.B. also stipulates the frequency response required from microphone input at a studio to radiated output, when interconnecting land-lines or links do not exceed 20 miles in length. This cannot be stated directly in decibels. It is necessary to refer to the mask shown on page 69 of the Board's Technical Standards, second edition. The Standards for Noise and Distortion are quoted on page 39.

It is true that f.m. can transmit easily a.f. tones up to 15 KHz., but in point of fact there is very little musical content in the audio frequencies above 10 KHz., and it is doubtful if the majority of people can hear them.

In the U.S.A. there are now many f.m. broadcasting stations, quite a number transmitting stereo, and it is an interesting exercise to examine photos of many studios of such stereo stations to find that only one mono. microphone is provided.

Briefly, in the U.S.A. system for transmission of stereo by f.m. broadcast stations, the left plus right stereo signals, up to 15 KHz., are transmitted normally. Then there is a highly stable "pilot" tone at 19 KHz., being followed by a signal comprising the left minus right stereo signals. These are on a sub-carrier placed 38 KHz. out from the assigned station frequency and occupy the portion of bandwidth from 23 to 53 KHz. (±15 KHz. of 38 KHz.).



Block diag. of a Direct Carrier FM. exciter. In these two exciters note the elaborate means used to keep the carrier centre frequency correct.

This system of stereo transmission allows mono. receivers to reproduce the left plus right signals as normal mono. so that the system is compatible for mono. receivers.

Many U.S.A. f.m. broadcasters also have what is known as s.c.a. (sub. carrier authorisation) and use this to transmit continuous music for background music for shop, factories, hotels, etc., and derive considerable revenue by selling the service to such customers.

S.c.a. is based on a sub-carrier, centered on 67 KHz., the modulation occupying the range from 59 KHz. to 75 KHz. The presence of the stereo and s.c.a. sub-channels calls for a reduction in the frequency deviation (% modulation) of the main and stereo channels to 80%, whilst the 19 KHz. "pilot" and the s.c.a. channels each take 10%. As a result, at 100% modulation the total deviation of the f.m. carrier is ±75 KHz.

If the stereo and s.c.a. are not being transmitted, then the normal a.f. band to 15 KHz will use the full deviation of ±75 KHz. However, irrespective of whether mono., stereo or s.c.a. is being transmitted, the maximum deviation is 75 KHz.

In an amplitude modulated system, irrespective of the actual mode of transmission, it is essential that the carrier frequency remains constant within close limits and this is the reason broadcasting stations use temperature controlled quartz crystal oscillators. It is common for the temperature to be held at 55°C. ±1°. The frequency of all m.f. broadcasting stations in Australia must be held within ±10 Hz. If the frequency is allowed to drift excessively then receiver tuning becomes difficult.

Stories of m.f. stations varying greatly in frequency are brought about because of drifting mixer oscillators in superheterodyne receivers. The writer's car receiver, transistorised, drifts, particularly at the low frequency end of the m.f. band, and is recognised as a receiver defect.

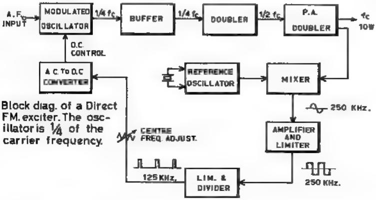
THEORY OF OPERATION

As described earlier, frequency modulation and phase modulation are both variants of angle modulation.

Now frequency modulation, as its name and definition imply, is obtained by changing the frequency of a carrier wave during the modulation process. Actually, the frequency must be swung symmetrically above and below the assigned frequency and a problem which arises in f.m. transmission is to be able to vary the frequency at the same time holding the centre frequency constant.

In an a.m. transmitter, whether self-excited or crystal controlled, every endeavour is made to make the oscillator as stable as possible, but this class of stability can cause difficulties with frequency modulation, but may be easier with phase modulation.

A.m. broadcast transmitters usually have a small variable reactance connected across the crystal circuit because it is possible to get a small variation



Block diag. of a Direct FM. exciter. The oscillator is ¼ of the carrier frequency.

in frequency by altering the reactance across the crystal. One particular crystal oscillator, of the writer's knowledge, could be shifted ±30 Hz. (in the middle of the m.f. band).

However, if a self excited oscillator is used it is possible to obtain very wide changes in frequency by varying the reactance of the oscillator "tank" circuit.

Many s.w. broadcasting stations, which have to change frequency quickly, use self-excited oscillators instead of crystal oscillators, however, these oscillators are inherently very stable.

Obviously if some way could be found to vary, at audio frequencies, a reactance shunted across a self-excited oscillator "tank" it would be possible to vary the frequency of the oscillator at audio frequencies, thus producing frequency modulation.

Fortunately a valve can be operated in a special manner so that it appears to be a reactance, furthermore, if an audio frequency voltage is applied to its grid then the valve will appear to be a variable reactance.

Now if such a valve is connected across the "tank" circuit of a self-excited oscillator, the frequency of the oscillator can be made to vary above and below its normal frequency in accordance with the audio frequency voltage impressed on the grid of such a reactance valve, or as more commonly termed, a reactance modulator.

Also, if a reactance valve modulator is connected across a quartz crystal oscillator it can produce a small amount of phase shift, which is phase modulation. It may be connected across the tank circuit of an amplifier stage to produce phase modulation and as a change in phase is also a change in frequency, a small phase change at a low frequency can be multiplied to become a large frequency change at a higher frequency.

Another variable reactance device is a **varactor diode** and in 1970 in the U.S.A. this device has almost completely supplanted the valve reactance modulator in broadcast f.m. transmitters.

There are several other methods of generating angle modulation in addition to phase modulation and frequency modulation as described above.

These are a magnetic frequency modulator, the Shelby cathode-ray tube, and the phasition tube and the klystron tube. These are now redundant for high quality angle modulation as used in f.m. broadcast work.

In the U.S.A., it is the usual practice for manufacturers to offer f.m. exciters with power outputs ranging from 10 to 20 watts for high fidelity use. If greater power is needed then these can be followed by one or more r.f. amplifiers to form a complete transmitter.

As of January 1970 there were at least nine manufacturers in the U.S.A. of such f.m. exciters and broadcast f.m. transmitters. It is interesting to examine some of the data for these exciters:

Only one manufacturer made an all-valve, 10-watt exciter, and this was the only one using phase modulation. (This is a Serrasoid phase modulated exciter.)

Seven of the remaining makers use all solid-state techniques with transistor output. The other maker uses solid-state devices and a valve output.

Then six of the nine makers use a varactor modulator and two use transistors as the modulators. The varactor is a very high frequency device and in four of the makes it is used to modulate the oscillator which is at the carrier frequency. This is known as direct carrier f.m. (d.c.f.m.).

Some of the others prefer to modulate the oscillator at a lower frequency. As this is direct modulation of the oscillator on another frequency, it is known as direct f.m. (d.f.m.).

In Britain, the Marconi Co. developed a method to obtain f.m. by direct modulation of a quartz crystal oscillator operating at 1/24th of the carrier frequency. This has been given the trade name of f.m.q., standing for frequency modulation, quartz.

Also in Britain, S.T.C. manufactured f.m. broadcast type transmitters using reactance valve modulators.

(to be continued)

INTRUDERS INTRUDERS

WHAT IS ON
14008 KHz.?

Please report details to your Divisional Intruder Watch Co-ordinator.

OBSERVATION POST

By HF EVERTICK

Spending a few hours walking round the 13th National Radio and Electronics Engineering Convention displays of the I.R.E.E. in Melbourne at the end of May turned out to be interesting and very instructive.

Time did not permit attendance at any of the lectures given in separate halls, but some of the subjects caught the Amateur imagination — telemetry system for small projectiles at about 460 MHz., semiconductor reliability testing, crystal filter designs, cylindrical dipole antenna equations, stripline u.h.f. frequency multiplier circuitry, Intelstat tracking, telemetry and command services, hybrid micro electronics and so on. An interesting sidelight was the interference by various transmitters to human body implants, as for example, heart pacers.

The Amateur content of the various stands was often quite low. Here and there the eye locked onto displays of components of which some of the latest developments could be outside our pocket range. In between all the computer material, colour t.v. dems., carphones, test equipment, visual telephones and recorder (both sound and video) goodies there before your vision would be undoubtedly Amateur-looking equipment. As, for example, the Acitron SSB400 transceiver with digital frequency read-out designed and manufactured here in Melbourne. On another shelf the Acitron SSB100 transceiver and further along a linear—all include the 160 mx band through to 28 MHz., and 2 metres on the 400. Some, I was told, are in production, others are in prototype form.

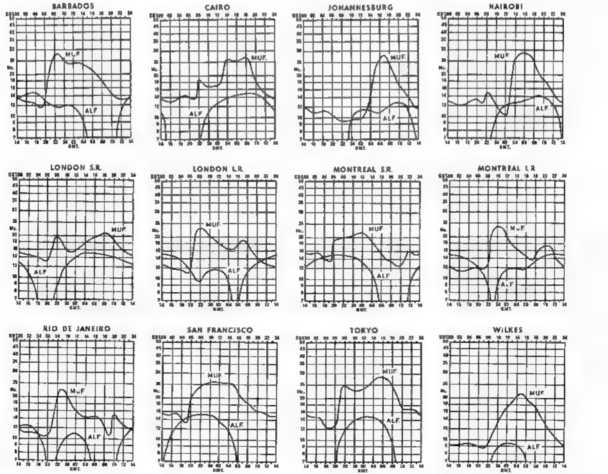
Round the corner I spotted an elaborate Eddystone receiver with continuous tuning from 10 KHz. to 30 MHz. on all modes, some Geloso amplifiers and, upstairs, a very neat Collins 65S1 digital read-out receiver with manual or automatically selected or controlled frequency spot tuning.

Nothing much of interest in antennas for Amateur h.f. use other than whips, but one stand displayed a 10 ft. diameter precision parabolic spinning of the kind now lathe-turned in Melbourne and usable in the range 450 MHz. to 20 GHz.

Many of the advertisers in our journal were well represented.

PREDICTION CHARTS FOR JULY 1971

(Prediction Charts by courtesy of Ionospheric Prediction Service)



THE R.F. BRIDGE*

DON NELSON, WB2EGZ

Sometimes an important idea goes unnoticed or is not sufficiently developed to gain wide acceptance. Such, I believe, is the case of the radio frequency bridge. The r.f. bridge has been marketed for many years by the General Radio Company[1]; however, this precision instrument is probably too expensive for most Amateurs. A moderately priced r.f. bridge, manufactured by Omega-t Systems,[2] has been available for several years. Oliver Swan, W6KZK, described the basic circuit of the r.f. bridge in an earlier issue of "Ham Radio".[3]

Few Amateurs seem to have recognised the advantages of the r.f. bridge over the simple v.s.w.r. bridge. The r.f. bridge, for example, will allow you to optimise your antenna, thus reducing the dependency on a matching network. The r.f. bridge has other uses as well, some of which I'll discuss in the following paragraphs.

THE CIRCUIT

The instrument consists basically of a broadband noise generator coupled to a bridge network by a wideband 1:1 balun transformer. By carefully compensating for circuit strays, the bridge upper frequency limit can be extended to 450 MHz.

The circuit of Fig. 1 was developed not without some difficulty, mainly in reducing circuit strays and constructing the balun transformer. In its present state of development, this circuit is useful to 220 MHz.

The noise generator uses a zener in an unstable (thus noisy) mode by operating it at low current. It will pay to experiment with the value of R1 for the highest noise level of your zener. When the noise-generator output is amplified by a two-stage broadband amplifier, the instrument is useful from about 1 to 450 MHz.; again, the upper frequency limit is determined by how well wiring strays are compensated.

CONSTRUCTION

Simple construction was used, with parts mounted on a perforated board. Battery power was used for maximum utility. Wiring the bridge circuit is tricky, as might be expected with broadband equipment. If the layout shown is followed, you can expect good results. I feel there may be better layouts, and I'm sure that every unit built will be slightly different with regard to compensation for circuit strays

By far the most difficult part of the construction is the toroidal balun. The resultant transformer,[4] shown in Fig. 1 has broadband characteristics that exceed those of the more common trifilar-wound units. Pay strict attention to details!

The bridge section was laid out with regard to u.h.f. performance, keeping wires on one side of the bridge equal to those on the other. Wiring strays are compensated by balancing them with the exact capacitor combination that gives the best null. Because I have found the trimmer adjusts slightly differently on 6 metres and higher, I assume there are a few sneaky r.f. paths. One suspect component is the large carbon potentiometer. Our sophisicated doubts about the layout are unfounded below 30 MHz., however. (Solid relief for the unsophisicated worrier.)

This gem is self-contained in a Bud CU2103-A Minibox, ready to check antennas, receivers, quartz crystals, and other series-resonant circuits. You will, of course, need a receiver for null detecting at the frequency of interest.

Recommended replacement for the common v.s.w.r. bridge — the radio-frequency bridge and noise generator.

CALIBRATION AND USE

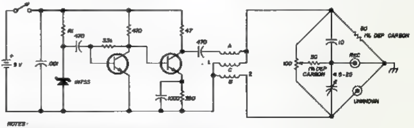
In theory, if not in practice, the 100-ohm pot. will balance any resistance placed in the "unknown" arm of the bridge. At one end of the scale is zero; at the other is infinity Fifty ohms is mid-rotation with a linear pot. At 50 MHz. and higher, I've found a rotational shift of the 50-ohm (r.f.) point. This means a special calibration check will be necessary at very high frequencies (v.h.f.). Normally, for the h.f. range, the dial calibration will hold.

The best null is at midrotational scale. Because the null deteriorates at the extremes of rotation, it is not worthwhile to use the instrument beyond a 20-to-300 ohm range.

Calibration is performed using non-inductive resistors of known values placed, then nulled, across the "UNK" terminal, with a receiver connected to the "REC" terminal. Carbon composition resistors are fine if values are known to 5%. Above 100 MHz., deposited carbon resistors are preferable because of their low inductance The dial plate should be calibrated in the h.f. range, say 10 MHz. Trim the bridge capacitance for best null with a 50 ohm resistor and correct setting of the pot. Don't be too surprised if a 50 ohm resistor changes value through the v.h.f. range.

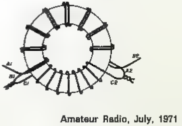
ANTENNA MATCHING

Tuning an antenna with a v.s.w.r. bridge is a hit or miss proposition, because the v.s.w.r. bridge confuses resistive and reactive impedances. I don't mean to imply that accurate tuning is impossible with the v.s.w.r. bridge, but without a tedious procedure, the lowest v.s.w.r. will probably occur at a frequency different than that of optimum transmission. The r.f. bridge technique eliminates the tuning error, and allows an accurate measurement of v.s.w.r. once the antenna is correctly tuned.



NOTES:
1. R1 - CHOOSE SUITABLE VALUE FOR BEST NOISE OUTPUT (APPROX 2200 OHMS)
2. TRANSISTORS - 2N918, 2N3563, OR HEP 56
3. 0.375 OD TOROID FORM, INDIANA GENERAL CF 102, CORE MATERIAL 03

Fig. 1.—Schematic of the r.f. bridge and noise generator.



Windings A and B of the balun are No. 26 Formvar twisted 3 turns/inch before wrapping on core. Nine turns of the twisted pair are wound on the core. Winding C is also 9 turns of No. 26 Formvar, continuing the A and B winding direction and connecting A2 to B1.

* Reprinted from "Ham Radio," December 1970.

(1) First connect the r.f. bridge directly to the antenna or at an electrical half wavelength away from the antenna. An electrical half wavelength is different from the physical length of the wire. You can determine the electrical half wavelength with this bridge by setting the bridge to zero and placing a short across the end of the transmission line. Now cut small lengths from the line until a null is obtained at the frequency of interest (Fig. 2). Using a half wavelength or multiple thereof effectively places the bridge at the antenna, thereby reducing transmission line errors.

(2) Tuning the antenna to a frequency is the next step. You will find its resonant frequency by a null on the receiver. A sharper null will be seen with the bridge adjusted to the impedance of the antenna system. Adjust antenna length until the null occurs at the desired frequency.

(3) By adjusting the matching section, tune your antenna to the desired impedance as shown by the r.f. bridge.

RECEIVER INPUT MATCHING

Provided you already have a receiver to act as a null detector, you will find the r.f. bridge invaluable for determining the optimum tap position for inputs to converters, preamplifiers, and receivers. The procedure is the same as before, except that the "UNK" terminal is now connected to a receiver input. With the bridge dial preset to the desired impedance, adjust the tap on the antenna coil for best null (see Fig. 3).

OTHER USES

Any series-resonant circuit can be checked with the r.f. bridge. This, you will recall, is the combination that cannot be dipped easily on a grid-dip oscillator. Place the LC combination across the "UNK" terminal with the bridge dial set to zero. Tune receiver for null (see Fig. 4).

If a resistance is in series with L and C, the bridge will show its value. An interesting example of an R, L, C combination is the quartz crystal. While this bridge has limitations in crystal measurements, it is utilitarian. Set the dial to infinity (minimum noise for open circuit). Tune the receiver for an increase in noise at the resonant frequency of the crystal. Adjust the bridge for null. This value is the resistance of the crystal's RLC arm. In general, the lower this value, the higher will be the activity of the crystal.

Fig. 2.—Determining one-half wavelength of transmission line when using the r.f. bridge for antenna measurements.

The r.f. bridge takes over where the v.s.w.r. bridge leaves off. To my embarrassment, the r.f. bridge singled out several mistakes in my station, as it may in yours. I feel certain that building this bridge will be the most rewarding project the experimenting Amateur will undertake this year.

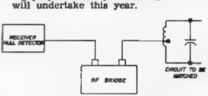
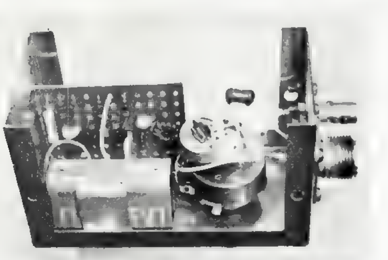


Fig. 3.—Arrangement for matching input circuits.

Grateful acknowledgment is made to Mike Ward, WB2YJK, for his efforts in the design of this project.

REFERENCES

1. General Radio Co., West Concord, Mass.
2. Omega-1 Systems, Inc., 516 W. Belt Line Road, Richardson, Texas, 75080.
3. Oliver Swan, W6KZK, "Impedance Bridge," "Ham Radio," February 1970, p. 67
4. C. L. Ruthroff, "Some Broadband Transformers," Proc. I.R.E., Vol. 47, August 1959, pp. 1337-1342.



Parts layout, which should be followed closely for trouble-free results.

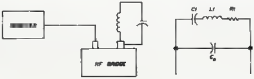


Fig 4.—Connections for checking series-resonant circuits. Network at right is the equivalent circuit of a quartz crystal.

☆

CR8 LICENSING

From Bill Hempel, VK1BH "Write to—

The Director,
Posts, Telegraphs and Telephones,
Dili, Portuguese Timor.

with photostat of your VK licence, whereupon a licence will be issued for three weeks with renewals available once you are there, subject to extension to your 14-day passport visa.

"Several call signs have been issued to VK8s, but nobody has operated because no transmitting gear may be imported."

HF Evertick comments, "Apparently this is one of those places similar to Iran where the right hand is more massive than the left. It is believed that there may be only two ways to circumvent this: either to initiate a long term approach to Lisbon through a local Portuguese representative or possibly direct or to be on good terms with a V.I.P. in the Administration to give assistance to import gear into the country. If a local resident has a licence, it might be possible to do a deal through him, but this avenue may already have been explored. There seems to be scope here for a reciprocal licensing agreement.

"Quite obviously, it would be very awkward if equipment were to be smuggled into the country since difficult questions would arise if subsequently discovered, quite apart from the unlawful aspects of smuggling as such, which is an illegal activity always to be frowned upon. It was not too many years ago that an overland tourist with a mobile rig in his caravan arrived at a remote Customs House in 3V8 and was imprisoned, merely for possessing it, until he could contact his Embassy and get himself released some days later."

HOME STATION ANTENNA FOR 160 METRES

Part Three—The Balanced Horizontal

J. A. ADCOCK,* M.I.E. (Aust.) VK3ACA

INTRODUCTION

A short low horizontal on medium frequencies has a very poor efficiency. Horizontal antennas should be made as large as possible, but in most cases only small dimensions are practicable. Even an antenna 120 feet long and 60 feet high is small and rather inefficient compared with a resonant antenna a quarter wave length high.

If the antenna is to be used for multi-band, the most satisfactory arrangement would be a centre fed with 600 ohm open wire feed line and tuned at the transmitter. Such an antenna will provide the dual function of a "horizontal doublet" or a "T" with the feeders in parallel.

This section will deal with this type of antenna and will endeavour to show what can be obtained from a balanced horizontal for transmission and reception.

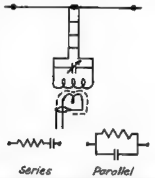


Fig. 13.—The method of feeding a short horizontal antenna and the equivalent series and parallel circuits of the load of the antenna.

The radiation resistance of a horizontal antenna is most affected by the presence of the ground. Because this is a secondary effect and the ground is not directly in series with the electrical circuit, the radiation resistance and the efficiency is much more difficult to predict. These estimations are difficult because the depth of the virtual ground below the actual ground cannot be known and the dielectric constant and resistivity of the ground cannot be easily measured. Even if they could, the calculations are far too involved.

In a lossless system the radiation resistance not only becomes lower the shorter the antenna, but becomes lower the closer it is to the ground, and on the ground would equal zero. In a lossy system the losses will be very large for an antenna of very low radiation resistance. If the ground is lossy the feed point resistance will be higher, but the absorbtion of the signal will be considerable.

Because the radiation resistance is lower for the horizontal than the vertical, the vertical mode will dominate. Therefore, if we desire to take advantage of the horizontal antenna for either transmitting or receiving, it must be perfectly horizontal and the feeders must be perfectly balanced. To obtain good balance the antenna should be geometrically balanced.

As with the vertical, the calculation of radiation resistance at the centre of a short dipole in free space is fairly simple. To determine the resistance at a distance along the feeder and to introduce the effect of the ground is much more involved. In the following sections, methods of how this can be done and some simplified methods are suggested. As discussed earlier, the load can be considered as an effective parallel or series circuit but the series circuit is most commonly used. This, together with a parallel tuning circuit, is shown in Fig. 13.

The possibility of using a horizontal counterpoise was investigated by the author, but unfortunately this was found to be unworkable. A number of other experiments and on-air checks were tried to test the theories presented in the next sections.

CALCULATIONS FOR HORIZONTAL ANTENNAS

The radiation resistance at the centre of a balanced horizontal antenna in free space is given by:—

$$R_R = \frac{790\ L_R^2}{\lambda^2} \qquad (10)$$

where R_R = the effective series resistance component of the load at the feed point at the centre of the antenna.

L_R = the effective total length of the antenna.

The calculation of effective length of one leg of the antenna is the same as for a vertical. Length may be taken as $L \div 2$ for a short antenna, $2L \div \pi$ for a resonant antenna, or the form factor may be calculated from equation 3 or 5 or obtained from Fig. 7. The electrical length given in the graphs has been taken as the length of one leg of the antenna compared with a quarter wavelength as with previous calculations, i.e. $\lambda/4 = 1 = 90°$.

Similarly, as with equation (6) for a horizontal antenna

$R_R = 197.5$ (elect. length $\times$ F)^2 .. (11)

The comments relating to accuracy of calculation to long verticals also apply here.

From the equations it will be noticed that the radiation resistance of a centre fed antenna is twice that of a vertical of the same leg length. In the case of a vertical, the other half of the antenna is virtual or reflected in the ground. The curves and methods for vertical

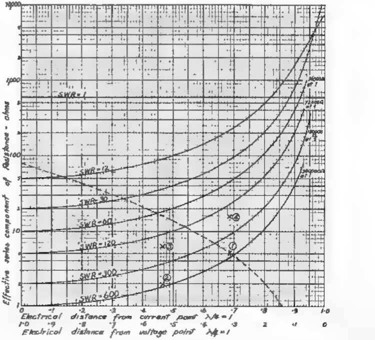


Fig. 14.—The curves shown represent the effective series resistance component of the load at various positions along a 600 ohm line over a range of s.w.r's. The dotted curve is the radiation resistance at the centre of a doublet in free space, the length of one leg of which is shown by the figures on the bottom line.

* P.O. Box 106, Preston, Vic., 3072.

antennas can be applied so long as the calculated resistance is doubled. The curves of Fig. 8 may have some application to end-loaded horizontals, although capacitance to ground, etc., may increase the effectiveness of the end load. The free space radiation resistance at the centre of the antenna calculated by equation 11 is shown by the dotted curve of Fig. 14.

In order for this value to be of any use it is necessary to know what resistance should be presented to the transmitter at the end of a 600-ohm line. A series of curves have been plotted showing the effective series resistance at a point along the line for various s.w.r's. To prevent complication, only the effective series resistance component is shown. These curves are similar to a set in the A.R.R.L. Antenna Book which give effective series or parallel resistance or reactance. However, the curves of Fig. 14 give a wider range. The curves were based on the equation:—

Series R =

$$Z_0 \left(\frac{Z_0 \; Z_R + Z_0 \; Z_R \tan^2 x}{Z_0^2 + Z_R^2 \tan^2 x} \right) \quad \text{.. (12)}$$

where Z_0 = characteristic impedance of the line (in this case taken as 600 ohms).

Z_R = resistance at the current point.

x = electrical distance from the current point.

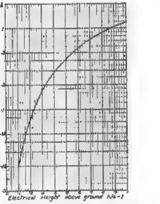


Fig 15.—Variation in radiation resistance of a short horizontal doublet above a perfectly conducting ground for relatively low heights.

The equation for reactance is not given here, but it was plotted and found to follow very closely the curve of Fig. 9 except close to the voltage point.

In applying the curves of Fig. 14, the distance of the current loop is taken as a quarter wavelength from the end of the antenna. If it is possible to know the reactance at the feed point, the electrical distance from the current point or the end of the antenna can be checked by using the open circuit reactance curves of Fig. 9 (ref. 4). It has been used for this purpose in the next series of this article—Part Four (Calculations and Discussions). The reactance component is also necessary if it is desired to calculate the effective parallel components of the load or it can be introduced into coil design calculations. In most practical cases of interest, it is unnecessary to consider the value of the reactive component of the load.

The measurement of the reactive component is difficult without a bridge but if r.f. voltage, current and power are known a reasonable result of both resistance and reactance can be calculated from standard formulae. The variation in radiation resistance of an antenna above a perfectly conducting ground is shown in Fig. 15. Possible applications of the change of resistance curve of Fig. 15 to determine the radiation efficiency of the antenna are discussed in the next series.

REFERENCE

4. Radiotron Designers' Handbook (fourth edition). Reactive component of impedance, p. 803.

TWO-STUB NOTCH FILTERS FOR T.V.I.*

Barry Priestley, G3JGO, has sent along some useful information on a technique which appears to offer an extremely effective means of producing filters providing a deep notch at a specific frequency. This system is an extension of the established use of single co-axial stubs, but using two stubs.

Information on this technique, published in the Swiss journal "Old Man," was passed to G3JGO by Geoff Stone, G3FZL, and translated by J. H. Hill, G3JIP, who carried out a number of tests which confirmed the original claims; these results were subsequently confirmed by G3JGO and R. K. Hemmings, G3VCT.

About this time, further information was provided by W. Burton, G8ANQ, in this case using short-circuited half-wave stubs rather than the open circuited quarter-wave versions; he showed how the stubs could be "tuned" by using a pin to provide an easily variable short-circuiting device. Both versions are shown in Fig. 1.

As a result of all this combined effort, G3JGO draws the following conclusions on this promising technique: the notch can be made 70 to 80 dB. deep when using good quality ¼" co-axial cable; this compares with roughly 30 dB. for a single stub. The notch is also narrower, as might be expected from the use of two high-Q circuits.

The possibility of using three stubs in order to develop either a very narrow notch or alternatively using stagger tuning to provide a shaped response curve also exists, although these ideas have not been tried.

The spacing of the stubs is not critical—G8ANQ suggests 9" at 145 MHz., but has used 3" successfully. The lengths of the stubs are very critical; unfortunately bench alignment with a signal generator (as described in the G3SL article mentioned below) is difficult due to pulling of the generator. Capacitive tuning of open stubs, or the pin as a movable short circuit, has proved useful.

G3JGO considers that there is no reason why the open circuit version should not be used on a transmitter to notch out, for example, transmitter harmonics in Band 1. This particular application has not been tried although it would seem a logical extension of the techniques discussed many years ago by T. N. Lloyd, G3SL, "Curing T.V.I. with Co-axial Stubs" (R.S.G.B. Bulletin, March 1958). Either form of resonant stub could be used in various filter applications.

The G3SL article provided a great deal of practical information on making and using single co-axial stubs designed around the characteristics of a number of standard cables. Typically he used 3 ft. 7 in. of Uniradio 70 cable having a velocity constant of 0.67 to form an open circuited quarter-wave stub to attenuate 43 MHz. harmonic output of his transmitter; he suggested starting with about 5 ft. cable and snipping bits off until the notch was at 43 MHz., using a signal generator and valve voltmeter alignment techniques.

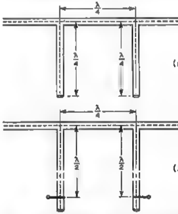


Fig. 1.—Two stub filters capable of providing a notch of about 70 or 80 dB at centre frequency. (a) is the open-circuited quarter wave stubs; (b) the G8ANQ version using short-circuited half wave stubs with movable "pin" short-circuiting device.

* Reprinted from "Radio Communication," Technical Topics, December 1970.

PROVISIONAL SUNSPOT NUMBERS

APRIL 1971

Dependent on observations at Zurich Observatory and its stations in Locarno and Arosa

Day	R	Day	R
1	39	16	104
2	56	17	98
3	56	18	104
4	56	19	110
5	63	20	103
6	58	21	98
7	29	22	82
8	61	23	65
9	43	24	50
10	52	25	44
11	46	26	53
12	88	27	50
13	100	28	49
14	113	29	48
15	136	30	38

Mean equals 70.7.

Smoothed Mean for Oct. 1970 91.8.

—Swiss Federal Observatory, Zurich.

Australis Oscar Balloon Report

G. N. LONG, VK3YDB*

THE TECHNICAL ASPECTS

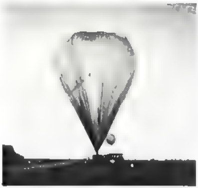
Last month a report was presented by Richard Tonkin on the Hi-ball flights which took place from Mildura during the months of April to May. This report will attempt to cover some of the technical results and some of the difficulties experienced during these four flights.

The package comprised the Australis receiver and the Australis transmitter with its associated keying circuitry. This was then encased in a minibox. Due to the nature of the other experiments being carried on the balloon, a great deal of r.f. "hash" is produced. In an attempt to minimise this a voltage regulator was also incorporated in the package. The h.t. from the balloon power system (20 to 25 volts) was fed to the regulator through an appropriate feed-through capacitor; the only other things on the box were two co-ax. output connectors. During the flight the translater package was housed in a polythene box, this being for thermal insulation.

The package was air-shipped to Mildura in the care of George Long, VK3YDB. Upon reaching Mildura and having consultations with the Hi-ball people, it was found that the package was small enough and the current drain low enough to fly on any of the flights in that series. This brought about many new problems in itself, one of which was that a new aerial would have to be fitted up for each flight. Aid came in the form of Kevin VK3ZKD, who worked for many hours and produced three aerials which were all used.

The aerials themselves were made of standard **cheap** flexible steel tape. This was chosen because it is a very easy medium from which an aerial, that is subject to many stresses, can be made. The two aerials were constructed to go on the same mast with about 20" of separation. The mast was constructed of 1" diameter plastic electrical conduit. The 144 MHz. aerial was a quarter wave ground-plane at the end of the conduit and below this the 432 MHz. aerial was constructed, this being a turnstile. The aerial positioning was very important and more will be said about this later.

* Eyre Road, Mt. Dandenong, Vic., 3788.



George VK3YDB was up before dawn to take this photo of the balloon being filled with helium gas.

The flight unit was tested in Mildura to make sure that the system still functioned satisfactorily, but, more importantly, to make sure that the translator could be integrated into the balloon package without undue interference between the systems on the package and the translator. During these tests a fault in the power supply developed; this caused the final amplifier in the transmitter of the package to be destroyed. At that late stage it was impossible to get a spare up from Melbourne so it was decided to fly the first flight with low transmitter output, this being under 100 mW. The only readily available transistor to operate at these frequencies in Mildura at that stage was in the author's rig, so, finally, a "TRW" type "B" transistor from this was used. After the first flight (70,000 feet), the package was shipped back to Melbourne and the correct device was inserted and power output brought up to 1 watt.

As stated in the previous article, there were four flights. The package flown was the same for all flights, varying only in power output. The same aerial design was used for all flights; the aerial position with relation to the gondola was changed on two occasions.

The results of the four flights were:

Flight No. 1

Altitude—70K (70,000) ft.
Power output—less than 600 mW.
Aerial position—pointing upwards.

General result.—The flight was well received in both Melbourne and Adelaide; no report of reception in either VK1 or VK2. Moderate to heavy QSB. Heavy interference from other on-board equipment was experienced.

Copy from the package was readable until 50K after cut-down.

Flight No. 2

Altitude—105K (105,000) ft.
Power output—1 watt.
Aerial position—pointing downwards.

General results.—On ascent, the package was received well in both capital cities, but on reaching flight altitude the signal was lost in VK3; copy was still quite readable in VK5. The signal to VK3 was, in most cases, too far down to be read. The suspected cause for the loss of the signal was a large temperature inversion which was covering most of Victoria. It was observed that the level of interference from other equipment was very high. On recovery, it was found that the voltage regulator was faulty. The fault was traced to an IC. The package was again returned to Melbourne and the voltage regulator was changed and a much simpler design, using a 15v. zener and a 2N3055, was installed. No further problems were had with this circuit for any of the remaining flights.

Flight No. 3

Altitude—90K (90,000) ft.
Power output—1 watt.

General results.—The signal was observed to be a little bit stronger, but the same conditions as applied to Flight No. 2 took place in this flight. Signals were quite readable in VK3 during the ascent, but were almost totally lost after flight altitude was attained Again, an inversion was found to be covering the greater part of VK3. A valuable clue was supplied to the Group about this problem when stations in VK5 reported hearing VK3 stations calling even though the 432 MHz. transmission back to Melbourne could not be copied. Interference from on-board equipment

was again at a very high level, particularly the 2 MHz. c.w. beacon carried on the balloon. This was found to be because the 2 MHz. beacon aerial wrapped itself around the 432-144 MHz. aerials used by the Australis translator.

Flight No. 4

Altitude—120K (120,000) ft.
Power output—1 watt.
Aerial position—pointing upward

General result—exceptional. A four State hook-up took place. High level signals were received in VKs 1, 2, 3 and 5. No deep fades were reported and all the systems worked well. Interference from other systems on the balloon were very low. By cut-down, everybody using the experimental package had gone to work and no results were gained as to the behaviour of the package during descent. The most important fact to come out of the flight was that, even though an inversion was experienced during the flight period, there was not any deep fading or loss of the signal in the area covered by the inversion

The problem of why the package could not be received in VK3 during Flights 2 and 3 had many people thinking. The only reason advanced, which seemed to cover all the facts, was that the problem was not due to any single reason or fault, but due to a number of cumulative conditions. The fact that the problem showed up only when the aerial was pointing downwards seems to be the heart of the problem. The following is what was thought to have happened.

Because the aerial was pointing downward and subject to screening in certain positions of rotation of the balloon, the signal was reduced. This, with the added attenuation of the temperature inversion at the time, caused signals in VK3 to be too low to be read, but when the aerial was pointing upwards, the aerial was not screened and, so even after the attenuation of the inversion, good signals could be copied.

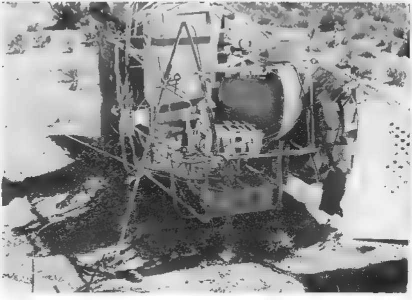
This problem is very important because, if an inversion alone is enough to stop signals on the 432 MHz. band, then signals from a satellite operating in this band would also be stopped.

It should be pointed out at this stage that it has been recorded that the rotation rate of the balloon could be as low as one rotation every two hours so, if the aerial was screened by some part of the gondola, it could remain screened for up to two hours.

It was noticed that mobiles travelling in the respective capital cities that had not heard of the balloon flights and were using Channel B for their morning run to work, were getting into the package with very good signals on some occasions.

Any future launches of the balloon series (it is hoped to have some more shortly) will be publicised in all States with as much notice as possible to give everybody a chance to get into the package and so prepare their equipment for the future launch of Australis-Oscar 6.

The instrument gondola of the 120,000 feet Hi-Bal Balloon Flight after landing near Mildura.



The gondola after landing. The 144/432 MHz. antenna can be seen (somewhat bent) in the foreground

TECHNICAL ARTICLES

Readers are requested to submit articles for publication in "A.R.," in particular constructional articles, photographs of stations and gear, together with articles suitable for beginners, are required.

Manuscripts should preferably be typewritten but if handwritten please double space the writing. Drawings will be done by "A.R." staff.

Please address all articles to:
EDITOR "A.R.,"
P.O. BOX 36,
EAST MELBOURNE,
VICTORIA, 3002

AMATEUR FREQUENCIES.
USE THEM OR LOSE THEM!

VK-ZL-OCEANIA DX CONTEST, 1971

W.I.A. and N.Z.A.R.T., the National Amateur Radio Associations in Australia and New Zealand, invite world-wide participation in this year's VK-ZL-Oceania DX Contest.

Objects. For the world to contact VK, ZL and Oceania stations and vice versa. Note.—VK and ZL stations, irrespective of their locations, do not contact each other for Contest purposes except on 80 and 160 metres.

Dates. Phone: 24 hours from 1000 GMT on Saturday, 2nd October, 1971, to 1000 GMT on Sunday, 3rd October, 1971.

C.W.: 24 hours from 1000 GMT on Saturday, 9th October, 1971, to 1000 GMT on Sunday, 10th October, 1971.

RULES

1. There shall be three main sections to the Contest:
   (a) Transmitting—Phone;
   (b) Transmitting—c.w.;
   (c) Receiving—phone and c.w. combined.

2. The Contest is open to all licensed Amateur transmitting stations in any part of the world. No prior entry need be made.

Mobile marine or other non-land based stations are not permitted to enter.

3. All Amateur frequency bands may be used, but no cross-band operation is permitted.

Note.—VK and ZL stations irrespective of their location **do not** contact each other for Contest purposes **except on 80 and 160 metres**, on which bands contacts between VK and ZL stations are encouraged.

4. Phone will be used during the first week-end and c.w. during the second week-end. Stations entering both sections must submit separate logs for each mode.

5. Only one contact per band is permitted with any one station for scoring purposes.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a competitor, and must submit a separate log under his own call sign. (This is not applicable to overseas competitors.)

7. Entrants must operate within the terms of their licences.

8. **Cyphers**: Before points can be claimed for contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telephony) or RST (telegraphy) report plus three figures which may begin with any number between 001 and 100 for the first contact and which will increase in value by one for each successive contact.

Example: If the number chosen for the first contact is 021, then the second must be 022 followed by 023, 024, etc. After reaching 999, start again from 001.

9. **Scoring:**

(a) **For Oceania Stations other than VK/ZL**: 2 points for each contact on a specific band with VK/ZL stations; 1 point for each contact on a specific band with the rest of the world.

(b) **For the rest of the world other than VK/ZL**: 2 points for each contact on a specific band with VK/ZL stations; 1 point for each contact on a specific band with Oceania stations other than VK/ZL.

(c) **For VK/ZL Stations**: 5 points for each contact on a specific band and, in addition, for each new country worked on that band, bonus points on the following scale will be added:

1st	contact	50 points
2nd	"	40 "
3rd	"	30 "
4th	"	20 "
5th	"	10 "

(d) **80 Metre Segment**: For 80 metre contacts between VK and ZL stations, each VK and ZL call area will be considered a "scoring area", with contact points and bonus points to be counted as for DX contacts.

Note.—Contacts between VK and ZL on 80 metres only.

(e) **160 Metre Segment**: For 160 metres, contacts between VK and ZL, VK and VK, ZL and ZL, and VK/ZL to the rest of the world: Each VK/ZL call area will be considered a "scoring area" with contact points and bonus points to be counted as for DX contacts [Rule 9 (c)].

Note.—A contestant in a call area may claim points for contacts in the same call area for this 160-metre segment.

For this purpose the A.R.R.L. Countries List will be used with the exception that each call area of W/K, JA and UA will count as "countries" for scoring purposes as indicated above.

10. **Logs**: (i.) **Overseas Stations**—

(a) Logs to show in this order: Date, time in GMT, call sign of station contacted, band, serial number sent, serial number received, points. Underline each new VK/ZL call area contacted. A separate log for each band must be submitted.

(b) **Summary sheet** to show the call sign, name and address (block letters), details of station, and, for each band, QSO points for that band, VK/ZL call areas worked on that band.

"All-band" score will be total QSO points multiplied by sum of VK/ZL call areas on all bands, while "single-band" scores will be that band QSO points multiplied by VK/ZL call areas worked on that band.

(ii.) **VK/ZL Stations:**

(a) Logs must show in this order: Date, time in GMT, call sign of station worked, band, serial number sent, serial number received, contact points, bonus points. Use a separate log for each band.

(b) **Summary** to show: Name and address in block letters, call sign, score for each band by adding contact and bonus points for that band, and "all-band" score by adding the band scores together; details of station and power, declaration that all rules and regulations have been observed.

11. The right is reserved to disqualify any entrant who, during the Contest, has not strictly observed regulations or who has consistently departed from the accepted code of operating ethics.

12. The ruling of Federal Contest Manager of the W.I.A. will be final.

13. **Awards:**

VK/ZL Stations: W.I.A. will award certificates as follows:

(1) To the top scorer on each band irrespective of single-band or multi-band operation and irrespective of call area, i.e. a maximum of one award may be made for VK and ZL, for each band.

(2) To the top scorer in each VK and ZL call district, i.e. a maximum of 15 awards, 10 VK and 5 ZL awards may be made.

To be eligible for awards in either of the above mentioned categories an operator must obtain at least 1,000 points or there must be at least three competing entries in the category.

Overseas Stations: Certificates will be awarded to each country (call area in W/K, JA and UA) on the following basis:

(1) Top scorer using "all bands" provided that at least three entries are received from the "country" or the contestant has scored 500 points or more.

(2) Other certificates may be awarded, to be determined by conditions and activity.

N.B.—There are separate awards for c.w. and phone.

14. **Entries**: All entries should be posted to Federal Contest Committee, W.I.A., Box N1002, G.P.O., Perth, Western Australia, 6001, **or** N. Penfold, 388 Huntriss Road, Woodlands, Western Australia, 6018. VK/ZL entries to be **received** by 31st December, 1971. Overseas entries to be **received** by 22nd January, 1972.

RECEIVING SECTION

1. The rules are the same as for the transmitting section, but no active transmitting station is permitted to enter this section.

2. The Contest times and logging of stations on each band per week-end are as for that transmitting section except that the same station may be logged twice on any one band—once on phone and once on c.w.

3. To count for points, logs will take the same form as for transmitting, as follows: date, time in GMT, call of station heard, call of the station he is working RS(T) of the station heard, serial number sent by the station heard, band, points claimed. Scoring is on the same basis as for transmitting section and the summary should be similarly set out with the addition of the name of the S.w.l. Society in which membership is held if a member.

4. Overseas Stations may log only VK/ZL stations, but VK receiving stations may log overseas stations and ZL stations, while ZL receiving stations may log overseas stations and VK stations.

5. Certificates will be awarded to the top scorer in each overseas scoring area and in each VK/ZL call area provided that at least three entries are received from that area or that the contestant has scored 500 points or more.

REMEMBRANCE DAY CONTEST, 1971

In recent years a close relationship has developed between the N.Z.A.R.T. and the W.I.A. in many fields. This year, reflecting these ties, New Zealand Amateurs are invited to participate for the first time in the W.I.A. Remembrance Day Contest. Whilst the scores of the ZL operators will not affect W.I.A. Divisional scores for the Trophy, they will be eligible for the Certificates specified in the Rules, and to this end are invited to submit logs to the Federal Contest Manager in Brisbane. It is hoped that the participation of New Zealand operators will add considerably to the activity on the bands and to the success of the Contest.

A perpetual trophy is awarded annually for competition between Divisions of the W.I.A. It is inscribed with the names of those who made the supreme sacrifice and so perpetuates their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitably inscribed Certificate.

Objects: Amateurs in each VK Call Area, including Australian Mandated Territories and Australian Antarctica, will endeavour to contact Amateurs in other VK and ZL Call Areas on all bands. Amateurs may endeavour to contact any other Amateurs on the authorised bands above 52 MHz. (i.e. intrastate contacts will be permitted in the v.h.f./u.h.f. bands for scoring purposes).

Contest Date: 0800 hours GMT on Saturday, 14th August, 1971, to 0759 hours GMT on Sunday, 15th August, 1971.

All Amateur stations are requested to observe 15 minutes' silence before the commencement of the Contest on the Saturday afternoon. An appropriate broadcast will be relayed from all Divisional stations during this period.

RULES

1. There shall be four sections to the Contest—
   (a) Transmitting phone,
   (b) Transmitting c.w.,
   (c) Transmitting open,
   (d) Receiving Open.

2. All Australian Amateurs may enter the Contest whether their stations are fixed, portable or mobile. Members and non-members will be eligible for awards.

3. All authorised Amateur bands may be used and **cross-mode operation is permitted**. Cross-band operation is not permitted.

4. Amateurs may operate on both phone and c.w. during the Contest, i.e. phone to phone or c.w. to c.w. or phone to c.w. However, only one entry may be submitted for sections (a) to (c) in Rule 1.

An open log will be one in which points are claimed for both phone and c.w. transmissions. Refer to Rule 11 concerning log entries.

5. For scoring, only one contact per station per band is allowed. However, a second scoring contact can be made on the same band using the alternate mode. Arranged schedules for contacts on the other bands are prohibited.

6. Multi-operator stations are not permitted. Although log keepers are permitted, only the licensed operator is allowed to make contact under his own call sign. Should two or more wish to operate any particular station, each will be considered a contestant and must submit a separate log under his own call sign. Such contestants shall be referred to as "substitute operators" for the purpose of these Rules and their operating procedure must be as follows:—

Phone: Substitute operators will call "CQ RD" or "CQ Remebrance Day" followed by call of the station they are operating, then the word "log" followed by their own call sign, e.g. "CQ Remembrance Day from VK4BBB log VK4BAA".

C.W.: Substitute operators will call "CQ RD de" followed by the group call sign comprising the call of the station they are operating, an oblique stroke and their own call, e.g. "CQ RD de VK4BBB/VK4BAA".

Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.

Remembrance Day Contest Trophy

SCORING TABLE

To

From	VK0	VK1	VK2	VK3	VK4	VK5	VK6	VK7	VK8	VK9	ZL1	ZL2	ZL3	ZL4	ZL5
VK0	–	6	6	6	6	6	6	6	6	6	2	2	3	4	1
VK1	6	–	1	1	2	3	5	4	6	5	1	2	3	4	6
VK2	6	3	–	1	2	3	5	4	6	5	1	2	3	4	6
VK3	6	4	1	–	2	1	4	3	6	5	2	2	3	4	6
VK4	6	3	1	2	–	3	6	5	4	3	3	3	3	4	6
VK5	6	5	2	1	3	–	4	3	3	6	4	4	4	5	6
VK6	6	6	2	1	4	2	–	3	5	6	4	4	5	6	6
VK7	6	5	1	1	3	2	5	–	5	6	2	2	3	4	6
VK8	6	5	1	1	2	3	6	4	–	3	4	4	6	6	6
VK9	6	5	1	2	3	4	5	6	1	–	5	5	6	6	6
ZL1	6	1	1	1	2	2	5	3	5	6					
ZL2	6	1	1	1	2	2	5	3	5	6					
ZL3	6	3	3	3	4	4	6	4	6	6					
ZL4	6	4	4	4	5	5	6	5	6	6					
ZL5	1	6	6	6	6	6	6	6	6	6					

Note.—Read Table from left to right for points for the various Call Areas.

In addition, all intrastate contacts on 52 MHz. and above are worth 1 point each per band.

7. Entrants must operate within the terms of their licences.

8. **Cyphers.**—Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telephony) or RST (c.w.) reports plus three figures, that will increase in value by one for each successive contact.

If any contestant reaches 999 he will start again with 001.

9. **Entries** must be set out as shown in the example, using **only one side** of the paper and wherever possible standard W.I.A. Log Sheets should be used. Entries must be clearly marked "Remembrance Day Contest 1971" and must be postmarked not later than **3rd September, 1971.** Address them to **Federal Contest Manager, W.I.A., Box 638, Brisbane, Qld., 4001.** Late entries will be disqualified

10. Scoring will be based on the table shown.

Portable Operation: Log scores of operators working outside their own Call Area will be credited to that Call Area in which operation takes place, e.g. VK5ZP/2. His score counts towards N.S.W. total points score.

11. All logs shall be set out as in the example shown and in addition will carry a **front sheet** showing the following information:

Name ... Section ...
Address ... Call Sign ...
Claimed Score ...
No. of Contacts ...

Declaration.—I hereby certify that I have operated in accordance with the Rules and spirit of the Contest.

Signed ...
Date ...

All contacts made during the Contest must be shown in the log submitted (see Rule 4). If an invalid contact is made, it must be shown but no score claimed.

Entrants in the Open Sections must show c.w. and phone contacts in numerical sequence.

12. The Federal Contest Manager has the right to disqualify any entrant who, during the Contest, has not observed the regulations or who has consistently departed from the accepted code of operating ethics. The Federal Contest Manager also has the right to disallow any illegible, incomplete or incorrectly set-out logs

13. The ruling of the Federal Contest Manager of the W.I.A. is final and no disputes will be discussed.

AWARDS

Certificates will be awarded to the top scoring stations in Sections (a) to (c) of Rule 1 above, in each Call Area, and will include top scorer in each Section of each Call Area operating exclusively on 52 MHz. and above. VK1, VK8, VK9, VK0, ZL1, ZL2, ZL3, ZL4 and ZL5 will count as separate areas for awards. There will be no outright winner. Further Certificates may be awarded at the discretion of the Federal Contest Manager.

The Division to which the Trophy will be awarded shall be determined in the following way.

To the average of the top six logs shall be added a bonus arrived at by adding to this average the ratio of logs entered to the number of State licensees (including Limited licensees), multiplied by the total points from all entries in Sections (a), (b) and (c) of Rule 1.

$$\text{Average of top six logs} + \left\{\frac{\text{Logs Entered}}{\text{State Licensees incl. Z \& Y Calls}}\right\} \times \left\{\begin{array}{c}\text{Total Pts. from}\\ \text{all Entrants in}\\ \text{Sect. (a) (b) (c)}\end{array}\right\}$$

VK1 scores will be included with VK2, VK8 with VK5, and VK0 with VK7. Also, VK9 logs and score will be added to the Division which is geographically the closest. ZL scores will not be included in the score of any W.I.A. Division.

Acceptable logs for all Sections shall show at least five valid contacts.

The trophy shall be forwarded to the winning Division in its container and will be held by that Division for the specified period.

RECEIVING SECTION
(Section D)

1. This Section is open to all Short Wave Listeners in Australia and New Zealand, but no active transmitting station may enter.

2. Contest times and loggings of stations on each band are as for transmitting.

3. All logs shall be set out as shown in the example. The scoring table to be used is the same as that used for transmitting entrants and points must be claimed on the basis of the State in which the receiving station is located. A sample is given to clarify the position.

It is not sufficient to log a station calling CQ—the number he passes in a contact must be logged.

It is not permissible to log a station in the same call area as the receiving station on the m.f. and h.f. bands, 1.8-30 MHz., but on bands 52 MHz. and above such stations may be logged, once only per band, for one point. See example given.

4. A station heard may be logged once on phone and once on c.w. for each band.

5. Club receiving stations may enter for the Receiving Section of the Contest, but will not be eligible for the single-operator award. However, if sufficient entries are received, a special award may be given to the top receiving station in Australia. All operators must sign the declaration.

Awards

Certificates will be awarded to the highest scorers in each call area. Further Certificates may be awarded at the discretion of the Federal Contest Manager.

Federal Executive Report

Two meetings of Federal Executive have been held since the Easter Convention in Brisbane—one on April 28 and the other on May 26. At the latter meeting it was decided to split the work into two parts and to take all residual outstanding at a further special meeting early in June

Novice licensing was singled out for special discussions during June and July. The proposed extensions to the U.S.A. **telephony segments** of the h.f. bands by the F.C.C. on petitions received from a number of U.S.A. Amateurs was discussed at length and I.A.R.U. was addressed on the subject along the lines indicated in recent Divisional broadcasts

The various **appointments to F.E.** for the year 1971/72 were discussed. A new one this year is a Key Section Manager Detailed proposals relating to various forms of **interference** were included in letters to the Standards Association of Australia in relation to Draft Standards 1693 and 1695. The **Publications Department** (relating to overseas books and magazines) was taken over by the embryonic F.E. office early in May. An interim list of overseas books and their prices to members is available from Divisions. Subscriptions to overseas magazines are available through F.E. at Box 67, East Melbourne, Vic., 3002 The costs of magazine subscriptions will be found in this journal's advertisements. Compare these with the prices you would pay by direct subscription and such extras as the costs of buying foreign exchange.

The **$1,000 loan to the I.A.R.U. Region 3 Association** received much discussion since this would derive from the I.T.U. trust fund. This loan is for the express purpose of financing the Region 3 representative at the I.T.U's W.A.R.C. in Geneva currently in session, which will include discussions and decisions on all the frequency allocations. In order to safeguard the loan as reasonably prudent as possible, seven conditions were required to be met by the Region 3 Association. All this is in the hands of the W.I.A. Liaison Officer, David Rankin, VK3QV.

It was also noted that another Society of the Region 3 Association had decided to forego their claim for travel fares to and from the Tokyo Conference in March. F.E. regretted we could not follow suit because of financial stringency and the relative magnitude hitherto of the W.I.A. contributions to Region 3

A number of early **re-organisational** matters are beginning to come forward for decision, as, for example, the best method of handling a number of separate accounts hitherto maintained by voluntary and other efforts. **Project Australia** was also in the limelight and very great behind-the-scenes activity on this is currently going on. The objective is, of course, to disseminate the greatest possible amount of data as early as possible.

The change over of the **Federal Contests Committee** from VK6 to VK4 has taken place except that this year's VK/ZL Contest will remain with VK6ZDK. The new Federal Contest Manager is Peter Brown, VK4PJ. He and his team will receive and will assuredly need all our good wishes.

A number of routine matters were, of course, dealt with, too numerous to list, but here is a final thought. For those who will be advocating Novice licensing, it is a good thing to think about encouraging beginners but how about helping us to clear our bands of the intruders so that we can all have a bit more elbow room.

—VK3CIF.

EXAMPLE OF TRANSMITTING LOG

Date/ Time GMT	Band	Emission and Power	Call Sign Worked	RST No. Sent	RST No Received	Points Claim.

Note.—Standard W.I.A. Log Sheets may be used to follow the above form.

EXAMPLE OF RECEIVING LOG (VICTORIAN S.W.L.)

Date/ Time GMT	Band	Emission	Call Sign Heard	RST No Sent	RST No. Received	Station Called	Points Claim
Aug. '71							
14 0810	7 Mc.	A3 (a)	VK5PS	58002	—	VK6RU	1
14 0812	"	"	ZL2AZ	59007	—	VK3KI	2
14 1035	52 "	A3	VK4ZAZ	58010	—	VK5ZDR	2
14 1040	"	"	VK3ALZ	59025	—	VK3QV	1

Note.—Standard W.I.A. Log Sheets may be used to follow the above form.

VK1VP/P EXPEDITION FOR NATIONAL FIELD DAY CONTEST, 1971

ANDREW DAVIS, VK1DA*

The high mountains to the west of Canberra are very attractive for portable v.h.f. operation as some of them are easily accessible by road. Mount Ginini, 5,782 feet above sea level, with a good road leading to the D.C.A. installation on top and only 50 miles drive from Canberra has been chosen for many v.h.f. field operations by locals and others over the last couple of years. Another is Mt. Gingera, several miles south of Ginini and several hundred feet higher. Mt. Franklin is several miles north and correspondingly lower.

For this expedition, we were originally going to Gingera, but recent heavy rain had made access impossible. We settled on Ginini.

40 metre station. Other h.f. station was at other end of same table.

Eddie VK1VP, Graeme VK1CG, Reg VK1ZMR and I arrived on site by about 8.30 on the Saturday morning. Reg and I set up the tent and h.f. antennas; but there were problems with the beam and the dipoles. After raising and lowering the beam (with the dipoles mounted on top) four times, we decided to do without the 40 mx dipole as it was shorting against the 80 mx one. A simple operation was performed by Reg with a pair of side cutters, and we were away. We also forgot to make the beam tower rotatable, in the "heat of the moment", and that caused one more raising and lowering. Then, when we stood back and noticed that the director and reflector were not horizontal (and the beam looked more like a tornado victim), it was just too bad, and we left it that way.

We also had some trouble getting stakes into the ground. The hill must be solid rock—at least it was in the positions we were trying to get the stakes in!

Meanwhile, Eddie and Graeme were setting up the v.h.f. gear. The antennas took some time to assemble and the sun shone brightly on two backs for a couple of hours. The v.h.f. station was located in Eddie's Land Rover, which was really well set up for field operation. Shelves, speakers, power outlets, 240v. supply metering (for use when operating from 240v. instead of 12 volt batteries only) and antenna feed-throughs are permanently installed.

Eddie uses N type connectors from the "shack" to all antennas, using UR67 50-ohm co-ax. The antenna feed-throughs referred to above enable short lengths of co-ax. with B.N.C. connectors to be used in the "shack", making changes quick and reliable (e.g. changing converters or bands), and you do not have heavy co-ax. flopping around carrying your transmitter away when you turn the beam.

Quickest of all to erect was the 14AVQ—it's as light as a feather. Once you know where to clamp the thing together (that's easy, you mark the position with tape at home), it's a one-minute job to get up in the air from start to finish. However, you must spend some time with the radials as they are the secret of the antenna's success. The trap verticals can be unclamped in the centre or thereabouts and are then a suitable size for carrying on ski bars, etc.

We had everything up and running by about noon, so we sat about and listened to the bands until the contest started. We also had the occasional bite to eat.

I operated 40 most of the time, occasionally going to 20 on Sunday, when 40 slackened off. 40 was quite good and the vertical did well, scoring a G on phone and giving excellent coverage around Australia.

Reg operated on all the other h.f. bands. 20 was the best scorer for him, with 80 close behind. However, the beam did not go as well as we had expected; it did well on 20 and not well on 15 and 10, the reverse of what I would expect for a compact beam. So when 10 was open on Sunday morning, we didn't do too well. Reg also had a faulty speech amp., putting him out of action for a while.

TA33JR was about 24 feet above the ground. (Note strange angle of director and reflector.)

One very pleasant surprise was the lack of interference between the two h.f. rigs. They were about 1 foot apart. Some spots were as high as S8, but that is good compared to other rigs I have operated under similar conditions. There were no key clicks either, showing that once modified, these rigs are quite clean on c.w.

Graeme operated 52 MHz., and Eddie operated 144 and 432 MHz. The 146 f.m. gear was sitting between them, and whenever the mobiles in Sydney were silent, the f.m. provided some good contacts.

Generally though, v.h.f. conditions were poor. On 144, quite a few contacts were made into Sydney (normally easy from this mountain) and also

Fast refuel—one of many. Reg "supervises," Graeme checks oil, Eddie fills small can for next time.

with country stations that normally work the repeater only. Interstate, VK3AOT was heard on Saturday night and on Sunday morning. Just before packing up on Sunday afternoon, VK-3ZQC was worked, on 144 MHz. This was quite a contrast to last year, when we worked many VK3 stations.

We are hoping that the activity on the f.m. nets caused by repeaters will encourage more Amateurs to build and use equipment on the non-net or tunable sections of the v.h.f. bands. For it is certain that the results attained using f.m. and vertical polarisation are easy to beat using c.w., s.s.b. or a.m., on horizontal polarisation. Instead of having marginal contacts on f.m. net channels, we could be having solid reliable contacts, and more of them.

We started to pack up at about 2.30 on Sunday. 20 and 40 were still good for a few points, so I stayed on the air until about 3.15. I think there is a section of Murphy's rules which says that you cannot take home as much as you took, using the same space. In other words, you do an inefficient packing job when you are up on a mountain. We proved it! However, by about 4 p.m. we were on our way, with all the gear on board.

(continued next page)

* 32 Kalgoorlie Cres., Fisher, A.C.T., 2611

EQUIPMENT

Two FT200 transceivers, 80 metre dipole, TA33Jr triband beam, 14AVQ trap vertical (used almost 100% on 40).

Home-brew transmitters for 52, 144, 432 MHz. a.m., having power outputs of 40, 25 and 15 watts respectively. Common 50-watt transistor modulator/power supply for the 144 and 432 MHz. tx's, which operate from 12v. battery. Huge 12v. battery, charger for same, stabilised 12v. supply for converters.

A modified T.C.A. 1674 unit for 146 f.m. channels A, B and C, power output 55 watts.

FET or MOSFET converters for v.h.f bands—home-brew Home-brew receiver for 4-6 MHz tunable i f for 52 MHz. Collins 75S2 receiver for 21 MHz. i.f. for 144 and 432 MHz. Davco DR30 receiver for 21 MHz tunable i.f. for 144 and 432 MHz Spare transmitter for each above; spare converters for each band.

Four element beam on 20 ft mast for 52 MHz. Two 10 element beams stacked vertically for 144 a.m., matched with a half-wave section of 70-ohm co-axial line. Two 5 element beams stacked vertically for 146 f.m., matched as above. Four 9 element beams H-stacked for 432 MHz., matched with lines as above. All antennas fed with UR67 (50 ohm) co-ax.; fittings mostly N type from antenna to tx, BNC inside the shack.

2.5 kva. alternator, 75 yards extension cable, tent, towers for all beams, rope, headphones, morse keys, log books, etc., and FOOD.

The gear was carried in and/or on a Land Rover and a Valiant sedan.

We certainly had a good time in the contest and we are sure everyone else in it did also. A contest is a fine way of testing your gear and your operating techniques (including your temper). A field day is even better as it gives you a chance to get out of the power line noise and i t.v. plaguing you in the city.

Get together with some locals and organise an expedition for next year's contest. You don't need to do it on a grand scale—that can come later. It's easy to borrow camping gear or even hire it (same applies to the generator—share the cost among three or more).

We'd like to see some multipliers introduced for v.h.f. operation in this contest (higher scoring anyway). Seems peculiar that a 200-mile contact is worth the same points on 80 metres as on 432 MHz. Alternatively, how about multiple contacts? We invite comments and suggestions from other operators.

Finally, thanks to all the home stations who came on the air and provided some extra activity this year.

☆


Six metre beam. v.h f station in Land Rover 144 and 432 MHz beams 14AVO (note radials)

DEFINITE SUNSPOT NUMBERS FOR 1970

Day	Jan.	Feb.	Mar.	Apr.	May	June
1	115	131	137	112	118	102
2	83	96	139	105	118	92
3	78	83	113	121	122	84
4	69	68	107	116	119	63
5	66	72	107	120	113	59
6	67	93	103	115	115	57
7	30	104	111	123	96	56
8	37	103	118	147	87	61
9	59	123	120	172	90	60
10	84	138	125	188	111	92
11	108	176	103	163	132	123
12	128	153	69	163	134	138
13	145	146	104	141	142	163
14	160	134	64	134	145	166
15	166	115	65	106	159	168
16	145	139	48	92	161	153
17	160	142	29	82	169	148
18	168	143	41	68	178	134
19	165	120	48	67	176	105
20	133	135	93	65	146	99
21	118	138	115	64	143	96
22	104	132	122	57	135	96
23	79	164	135	67	108	87
24	73	165	140	90	132	102
25	96	173	142	93	110	126
26	128	143	122	81	125	127
27	130	150	119	88	126	114
28	156	146	110	106	105	112
29	154		103	112	118	124
30	138		111	116	116	127
31	131		101		127	
Mean	111.5	127.3	102 9	109.5	127.5	106.8

Day	July	Aug.	Sep.	Oct.	Nov.	Dec
1	137	77	98	63	86	91
2	153	63	104	57	82	78
3	155	64	110	42	80	78
4	150	59	115	56	78	78
5	165	65	120	75	67	88
6	161	63	133	63	89	80
7	125	72	136	72	96	91
8	115	82	125	76	69	100
9	104	75	116	78	77	96
10	90	71	103	79	78	110
11	81	75	83	75	97	120
12	74	73	76	80	89	110
13	79	82	73	84	105	90
14	68	94	76	87	117	85
15	61	108	75	87	128	84
16	61	100	68	84	133	68
17	59	99	65	84	136	63
18	56	103	75	78	135	79
19	92	113	96	83	132	95
20	92	117	114	70	128	104
21	120	117	129	69	119	101
22	122	108	109	73	205	97
23	106	101	104	89	96	85
24	110	116	129	100	77	66
25	122	114	114	111	82	75
26	138	109	107	117	88	64
27	153	91	87	142	74	53
28	146	101	85	131	89	50
29	153	114	81	139	78	59
30	122	120	77	126	103	74
31	108	111		117		68
Mean	112.5	93.0	99.5	86.6	95.2	83.5

Yearly Mean equals 104.7

—Eidgenossische Sternwarte, Zurich.

New Equipment

ACITRON SSB-400

We believe this unit (photograph is on the front cover), known as the SSB-400 and is designed specifically for Amateurs, is the first Australian designed and made product of this type.

The transceiver is basically a 400 watt p.e.p. transceiver covering the Amateurs bands 160 through to 10 metres and including also two metres at a lower power level of 20 watts p.e.p. out.

The receiver front end uses dual gate zener protected Mosfets for improved cross-modulation and inter-modulation performance. This in turn feeds into an integrated circuit balanced mixer which in turn goes through an eight-pole 9 MHz. crystal filter with a bandpass of aproximately 2.8 KHz. The i.f. system also uses dual gate zener protected Mosfets for greatly improved a.g.c. action, followed by the product detector and finally the audio system which delivers 3 watts of audio output at less than five per cent. distortion.

The local oscillator system starts with a 5-6 MHz. v.f.o. which is heterodyned with high frequency carrier crystals in an integrated circuit balanced mixer. The output of this feeds through band-pass filters before it goes into the transmit and receiver mixers, thus greatly reducing the possibility of spots.

The frequency readout incorporates approximately twenty integrated circuits in a complete frequency counter which in turn drives a set of gallium arsenide seven-segment display indicators. These of course have the advantage of greatly reduced size and greatly increased life over the more conventional nixie type display.

The clock oscillator for the frequency counter is a 100 KHz. crystal, this gives approximately 50 cycle accuracy on the readout itself. The readout system is designed to readout to the nearest 1 KHz.,but has a built-in scaling switch which enables the final decimal place to indicate 100 cycle steps.

The unit tunes directly both 7.5 and 15 MHz. which enables the digital readout clock oscillator to be accurately set up without any sophisticated test equipment.

The transmitter consists of a 9 MHz. balanced modulator, once again an integrated circuit, which gives greatly improved carrier suppression. This in turn feeds through the 9 MHz filter and into the transmitter mixer. The output of the transmitter mixer feeds through the receiver front end which is band switched to obtain the required spurious rejection, the output of this feeds through a broad-band transistor amplifier and finally into the p.a. valve. Apart from the final p.a. valve, which is a v.h.f. dual tetrode, the unit is fully solid state.

For two metre operation an in-built conversion system enables the 28 MHz. band to act as an i.f. for the two metre converter. Two MHz. coverage is given on ten and consequently also on two metres. The front end on two metres consists also of dual gate zener protected Mosfets and the transmitter output on two metres consists of strip lined v.h.f. transistors.

The transceiver comes complete with a matching power supply and extension speaker and has all the normal features such as v.o.x., a.l.c., c.w. both upper and lower sideband, noise blanker, etc.

The SSB-400 is currently in production and should be available to the general public during the month of September.

ZONE 29 AWARD

The Zone 29 Award is issued by the West Australian Division of the Wireless Institute of Australia to licensed Amateurs and S.w.l's throughout the world. To qualify for this award, the following conditions must be satisfied:—

1. Establishment of two-way communication with any twenty-five different Amateur stations situated in Zone 29. Communication to be made after 0001 W.A.S.T. January 1952.

2. The total of 25 different stations may be obtained by operation on one or more of the Amateur bands.

3. Any types of emission which are permitted by the local licensing authority may be used.

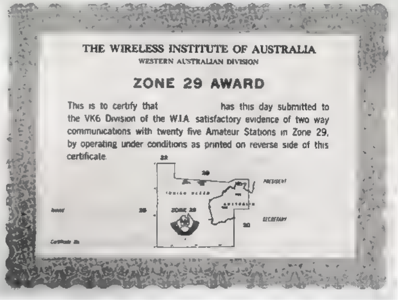
The Certificate will be endorsed when issued as confirmation of fulfilment of the following special conditions:—

(a) All 25 stations obtained from operation on one band only. (Open)
(b) All 25 stations obtained from operation of phone transmission (s.s.b., a.m., f.m., etc.).
(c) All 25 stations obtained from operation of c.w. transmission.
(d) All 25 stations obtained by one band operation and phone only.
(e) All 25 stations obtained by one band operation and c.w. only.
(f) 25 stations heard by S.w. Listener in (a) to (e) of above.

Confirmation in writing of all contacts must be submitted to:—

The Secretary,
W.I.A. (W.A. Division),
Box N1002, G.P.O.,
Perth, W.A., 6001,

together with $1(A) or 10 I.R.C.



CORRESPONDENCE:

NOVICE LICENSING

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

Editor "A.R.," Dear Sir,

I am somewhat perturbed by the correspondence which has appeared in your pages on the subject of Novice Licensing. Up to date this correspondence has all been from those who favour this type of licence, and nothing from those against the proposal. I am, therefore, compelled to the opinion that either such correspondence has been suppressed, or more likely, those against the proposal are suffering from the great Australian weakness of yielding to a very local minority

As I understand the position, a report was prepared by a sub-committee and presented to the last Federal Convention. I further understand that copies of the report will be made available on application to the chairman of the sub-committee (this information was garnered from the VK2 call-back on Sunday, 9th May, when VK2APQ broke in and announced the fact). If this report contains anything really important, surely it should have been published in the pages of "A.R.," so that all members may readily study it.

I have made it my business to read the report, and have also read the Federal Comment in June "A.R.," and I feel it is time some attention was drawn to the inaccuracies in the report, and some comments made about it in general

Firstly, it is obvious that the committee was composed entirely of gentlemen desirous of establishing a novice-type licence, and as one would expect, the report is biased accordingly They made major efforts to obtain opinions from overseas proponents of novice licensing, but apart from one small plea in a letter in your magazine, no other effort to obtain arguments against the proposal appear to have been made. They have made a rather weak attempt to state a case against the proposal, but to me they give the impression that they were not particularly anxious to go to much trouble in that matter, and such comments as they received or thought up for themselves (they admit doing so) are dismissed in as few words as possible

The report goes to some pains to point out that the Amateur population of the U.S.A. doubled between 1951 and 1961, but at least the report has the grace to say that this was possibly not entirely due to the advent of novice licensing. To my mind, the increase was due largely to two other factors which the report appears to ignore. There would logically be a natural increase, and at the same time the period 1951 to 1961 saw the introduction of the Technician Class licence Why the report does not cover this aspect more fully, when on the cover they quote figures from the U.S.A. which show that the Technicians out-number the Novices by nearly 2.5 to 1, eludes me. Why also does the committee list the number of Amateurs in Australia for September and October 1970 rather than for a period comparable with those they quote for the U.S.A.? Was it just a co-incidence that Australia showed no increase in October? Surely this is not the fairest way to seek a comparison.

Allow me to partly rectify their oversight, by saying that the Amateur population in Australia increased from 5,904 in December 1969 to 6,299 in December 1970, an increase of just over 6% in 12 months. From the figures quoted on the cover of the report, the increase in U.S.A. in the 10 months period March 1969 to January 1970 was only 152, which equals only 0.05%, and assuming the increase rate was maintained for a further two months, we arrive at 0.06% Fantastic! Is this the reason the committee saw fit to use the American figures for 1951 to 1961 rather than those for 1961 to 1971? Admittedly it looks very fine to see a doubling of the numbers, so let us have a look at the Australian scene. Although, so far, I have been unable to locate the actual figure for Australia for 1951, I am reliably informed that it was in the vicinity of 2,000 to 2,200, and certainly did not reach 2,500. In 1961 we had 4,400 licensees, and taking the middle of the first three figures, i.e. 2,200, what do we find? Right! We also doubled our Amateur population between 1951 and 1961. Sure we achieved a Limited Class licence in the period, but U.S.A. also achieved the Technician licence, so we evened with U.S.A., without Novices.

The report does not quote the percentage increase in U.S.A. during 1961 to 1971, nor do I have the figures available, but as a matter of interest the Australian figures rose from 4,440 to 6,299, an increase of 40%, which is still quite a respectable increase.

Repeatedly through the report, the inference is made that due to Novice licensing, other countries are at an advantage over Australia as far as the number of licensees is concerned, but is this true? Let us look at Appendix "C" of the report which lists countries with Novice licensing and the frequencies available to them, although, for the moment the frequencies are not under discussion. Using the latest available information from the I.A.R.U., as published in "A.R." last October, and the latest population figures I have been able to trace (U.N. Statistics and Consulates where possible), what do we find? Look at the table below:

Country	Amateurs	Popul'n ([redacted])	Proportion
Czechoslovakia	2300	14.2	1 in 6100
Dominican Rep.	500	4.2	1 in 8400
Finland	2000	4.5	1 in 2200
Faroe Islands	30	0.038	1 in 1266
India	*	*	*
Israel	600	2.8	1 in 5000
Japan	100000	101.1	1 in 1000
Korea	99	32.0	1 in 330000
Zambia	54	4.5	1 in 833000

* Adequately covered in Federal Comment "One in a Million."

There is no point in repeating the figures for U.S.A. as these are covered at great length in the report. The report also states that the position in Japan is three times better than in Australia, but is this so? Not on my calculations. It was recently stated that there are 250,000 Novices in Japan. If this is the case, what does it mean? Perhaps the Novice licence appeared subsequent to the compilation of the I.A.R.U. figures in mid 1970, and the Japanese figure should read 350,396. If this is the case (and until I see proof I doubt it) then the ratio of Amateurs to population looks most remarkable, but have a listen on 15 metres and decide whether or not you wish to have similar conditions in Australia. Also, what a fantastic effort to produce 250,000 Novices in six months.

Be that as it may, it would appear that the issuing of Novice licences does not do a great deal for the Amateur movement in the countries where such licences are available.

Looking further at the figures provided by the I.A.R.U., it is obvious that Australia is well above the average of the majority of countries in the world, in fact is bettered only by Argentina (1 in 1600), Canada (1 in 1400), Faroe Islands (1 in 1266), New Zealand (1 in 700—I cannot agree with the report of 1 in 1000), Norway (1 in 1400), U.S.A. (1 in 800) and Japan with an indefinite ratio. Perhaps the advocates for a Novice licence can explain why three of the countries with a better ratio than Australia do not have a Novice type licence Try as I may, I have been unable to see any great virtue in quoting the U.S.S.R. as an advertisement for Novice licensing, although the sub-committee saw fit to do so. With a population approaching 243 million, the figure of 18,085 licensees is not particularly impressive.

Let us look at some further figures for countries, which from the report, one would infer are technologically retarded as they have no Novice licence. Germany, 1 in 3850, United Kingdom, 1 in 3650; France, 1 in 9350, Italy, 1 in 15,000; Sweden, 1 in 2240; Switzerland, 1 in 6800. Who in their right senses would consider these countries technically backward?

The report states that "Amateur Radio in Australia is in a very retarded situation" With 1 in 1,940 is this really so? Surely the analysis of the figures quoted shows that this is far from being the case.

Appendix "D" lists 17 arguments in favour of an Australian Novice licence. After sifting the wheat from the chaff, very few valid arguments remain, and I query whether they are sufficient to warrant a Novice licence. To go through the whole 17 arguments at this time would take far more space than I feel you will grant, but let us look at one of them that has not so far been commented upon. Argument 8 can be summarised as:

(a) Increased licence fees will inhibit Amateur Radio.

(b) Inactive Amateurs will relinquish their call signs.

(c) Increased W.I.A. membership fees will tend to reduce membership.

(d) The number of Amateurs who are not members of W.I.A. is not pleasing.

(e) Any action which will increase membership will be beneficial to the Institute

(f) A Novice licence would bring additional citizens into the Amateur Service and into the sphere of Institute administration.

Whilst it is admitted that these are the committee's opinions", and that they look quite sound, should we not also look at the other side of the coin. There is so far no proof of (a), and when licence fees are considered against the cost of equipment, it does not appear a valid argument. As for (b), time alone will tell, but a check of the records show that there is quite a large number of licences not renewed every year, and these cannot be due to any increase in licence fees as there were none in the years reviewed. Possibly in two years a clear picture will emerge. There is some small evidence that (c) is valid, but until membership returns for 1971 are available I feel the committee is being a little pessimistic. In previous years when fees have increased, the W.I.A. still showed a nett increase. The latest fee increase being somewhat more than those in previous years, probably leads the committee to their conclusion. From what I have seen, I believe that the majority who do not renew their membership when due, eventually return to the fold. Whilst I agree wholeheartedly with the sentiment expressed in (d), an examination of the I.A.R.U. figures again show that Australia with 52% is better than "par for the course", and very much better than the countries which the committee is so fond of quoting. For example, in Japan 33%, New Zealand 42% and U.S.A. 38% of licensees are members of their national society As for (e), I would only alter it to read "any reasonable action".

Dealing briefly (I hope) with (f) what participation in Institute affairs can be expected? Being by now intoxicated with the idea that whatever America does is right for Australia, we will take the U.S.A. as a guide. We find that approximately 8.5% licensees are Novices. We may, therefore, expect approximately 520 Novices in Australia, of which (and again I quote the American figures, half, or 262, will not continue beyond the Novice stage. Of this 262, it appears that not more than 52% will become W.I.A. members. So after all this, we have 136 extra members of the W.I.A. and the committee recommends that these people should be Associate members of the Institute. Pray somebody tell me why Associates? Associate fees do not even cover the costs, and from the point of view of the licensee it would be, to say the least, frustrating to have a licence in any form and have no voting rights within the Institute. Remember what happened in VK6 when Limited licences became available! If that is not forming a "ghetto" I would like to know what it is. Okay, I will accept the idea that their position will improve once (and if) they get a full licence, but why not make them full members right from the start and give them every encouragement to go for a full licence? As for participation in the administration of the Institute, if one bases on past experience only 1 of the 136 joining the Institute will take any active part in its affairs. Whilst I feel they have partly nullified their own argument, I draw solace from the fact that in about 100 years there will be enough new members from the Novice ranks to supply all the executive officers to cover State and Federal requirements.

But enough of such levity. By now it should be obvious that the committee has not sold me on the idea of a Novice type licence. Perhaps the committee would care to expound their views on a few questions, and I mean expound and not brush aside with comments similar to those contained in their report such as "This is negatived by all the opinions of American correspondents", "This does not agree with American experience" This is not America but Australia, so let us do our own thinking. We get ample proof that America is far from perfect, and we already have too much of what is bad foisted on us (and I'm not referring only to t.v. programmes).

Amongst the things I would like to know are:

(a) Why did the R.S.G.B. decline a Novice licence when it was offered? Admittedly the English tend to be conservative, but there is usually very sound reasoning behind their actions.

(b) How did Argentina, Canada and New Zealand achieve more Amateurs per head of population than Australia without a Novice licence.

(c) What is going to happen to all the equipment in the possession of Novice licensees after the expiration of the one-year tenure recommended? Is it not reasonable to expect that

much of this equipment will prove to be too much of a temptation to the owners, and we will have a spate of piracy?

(d) How is the P.M.G's Department going to police the activities of this hoped-for increase in the Amateur ranks, when they do not have the manpower to adequately do the job at the present time?

(e) Assuming that the manpower can be found to adequately police the Amateur bands, what will be the cost and what will be required in the way of increased licence fees to meet such extra costs?

(f) What is the estimated costs of the straight-out administration of a Novice licence scheme as far as the P.M.G's Department is concerned, and will it affect examination and/or licence fees?

(g) With the best will in the world, it is impossible to imagine that there will not be an increase in the amount of t.v.i., b.c.i., etc., with the advent of Novices to the bands, and here again the load thrown onto the P.M.G's Department will be increased. Already the figures show that although the overall number of cases of interference is falling each year, the interference caused by Amateurs is on the increase. Surely this argues against the lowering of the required technical standards.

(h) In the event of a large growth in the number of interference cases, what is the likelihood of the Department taking the easy course and curing the trouble by cancelling all licences?

(i) Would it not be better for would-be-Novices and Novices of school-age to concentrate on their school studies?

In this regard I find the comment in the report somewhat facetious, more so as the committee comprises members of the teaching profession. While it is an accepted axiom that all work and no play makes Jack a dull boy, the fact remains that there will be a tendency for Novices of school-age to spend an undue amount of time fiddling with radio, rather than devoting their time to more essential studies, hence leaving Jack still a dull boy. A Novice licence is a vastly different proposition from attending some youth organisation activity one night a week. The position may be different in the case of a person contemplating a career in electronics, but in such a case their school studies simplify the problem of obtaining an A.O.C.P.

(j) Why does the committee recommend Novice allocations in all the h.f. bands with the exception of the 14 MHz. band? Their remarks regarding the 160 metre band show a lack of knowledge. To quote the report, "This band is not greatly used and would be suitable for low power local communication, such as within a district radio club network. With the low powered operation involved, it is unlikely that any undue risk of broadcast interference would occur". From my observations, I would say that 160 metre carries nearly as much work as does 80 and 40 metres, and further more, the occupancy is on the increase and will continue to do so, as it is now virtually the only band on which a.m. is the accepted mode, and those wishing to use a.m. can be assured of getting a contact. The band is not restricted to local work, many contacts being made inter-state, and this with powers of 10 watts or less. Surely those wishing to use 160 and a.m. are restricted enough now with only 60 KHz. without putting Novices there.

The report states "Amateur Radio offers wonderful therapy for handicapped persons and those located in remote areas. The main problem is one of training such people to the A.O.C.P. level and one must admit that this difficulty is insurmountable." Is the committee not aware that the P.M.G's Department already makes provision for physically handicapped persons, and this problem is by no means insurmountable. Indeed, the provisions are much more liberal for the handicapped than they propose for Novices. This problem is already being tackled in VK3 with some success. The problem is not as easy for the person located in a remote area, but I fail to see that it is insurmountable, unless the Novice advocates are grasping at straws.

Despite all the foregoing, there must be some reason or reasons why the Amateur populations vary so much from country to country. The first thought would be that the standards of education and economy vary widely. Whilst no doubt this is a factor, it does not explain why Canada and New Zealand both show better ratios than Australia. Let me take this a step further and look at the Australian scene, where the educational and economic levels between States show a negligible difference:

VK1	1 in 1400
VK2	1 in 2250
VK3	1 in 1690
VK4	1 in 2180
VK5	1 in 2100
VK6	1 in 1770
VK7	1 in 1640
VK8	1 in 1386

Why such a wide variation around the national average of 1 in 1940. The strangest aspect to my mind is the fact that the State with the largest number of Youth Radio Clubs, the most extensive facilities for the education of prospective Amateurs and the largest number and percentage of Associate members, shows the worst figures.

Is it possible that the deletion of the Aboriginal population from the count would make a difference? Certainly it would make a slight improvement to the averages. Briefly (and here I have only the 1966 census figures), the Aboriginal population in Australia is about 80,000, of which VK2 has 14,219, VK3 1,790, VK4 19,003, VK5 5,505, VK6 18,439, VK8 21,119. Although this may partly explain the differences, the theory falls down badly in the case of VK6 and fails completely in the case of VK8. There is a further possibility, and that is the migrant population, but I leave those figures for somebody else to work on. One could go on almost indefinitely along similar lines, but whether or not any worthwhile conclusions would be reached is a moot point.

If one accepts the proposition that the only desire of those advocating a Novice licence is to increase the Amateur population, can the desired result be achieved by other means? I believe it can, and in fact the committee's report points the way. Having looked at a number of recent examination papers, it appears to me that the advent of new techniques require a wider field of knowledge than was required 20 years ago, but the examination as such is no harder. Why then do we find a 75% drop-out/failure rate? Let us look at the W.I.A. classes. Whilst the intention is not to produce electronics geniuses, the object is to cram a rather large amount of learning into about nine to twelve months, and this only one night per week for two hours per night. Unless the student is prepared to do a fair amount of private study he faces an almost impossible task. He stands a much better chance if he has done some preliminary reading before ever joining a class. If nothing else, he will have gained familiarity with the language of radio, and with a little luck may even have managed to grasp some elementary theory. I do not for a moment suggest that this would entirely eliminate drop-outs, but I would expect it to reduce the number. The fact still remains that there will be a percentage not prepared to make the personal effort, and these will fall by the wayside, whether they are aiming at a Novice, Limited or Full licence.

This still leaves the problem of those who go through the class, but fail the examination. Here I blame the modern educational system. When I went to school (more years ago than I care to remember) we spent a large amount of time on the three R's. We also had a delightful subject known as "composition". From what I can see of the present system, not much attention is paid to such subjects. I see a fair amount of the product of the present system, and find the handwriting in the main illegible, the spelling atrocious, and the English expression almost beyond comprehension. What hope has a candidate of passing an examination requiring essay type answers to a specific number of questions in a limited time? Put yourself in the position of the person given the task of marking such papers. How would you mark a paper you could either not read or understand? Let us face it, there is no hope of changing the educational system, but there is a chance of changing the examination system.

I would wager that most of the candidates know the answers to the questions, and could talk on the subject at length, but they just cannot express their thoughts by the use of the written word. As I see it, a change in the examination system would remove any need (if such exists) for a lower standard of licence. By the same token, the extra effort to achieve a 75% pass as against, say, a 50% Novice pass, would not be so great and would result in greater personal satisfaction to the successful candidate, as well as achieving a full A.O.C.P. in one examination rather than in two examinations.

Can anything be done on the matter of the code? The pro-Novice group advocate 5 w.p.m. There are those that consider 8 w.p.m. acceptable, whilst the examination requires 10 w.p.m. Can we find a compromise? I believe so. As I recall it, the code examination takes only a matter of minutes. As a suggestion, would any advantage be found in devoting a little extra time to this part of the examination, and run say two or three minutes at 5 w.p.m., followed by two or three minutes at 8 w.p.m., followed by a further three minutes at 10 w.p.m. A pass could be gained with a mark of 95% at 5 w.p.m., 85% at 8 w.p.m., and 75% at 10 w.p.m., any one of the three being sufficient to qualify.

Sir, I thank you for the space you have made available. Much more could be said, much more research could and should be undertaken, but I would prefer others to do it. All I hope is that the foregoing will arouse the interest of all Amateurs in Australia and that they will consider deeply the matter of Novice licensing and not rush into a hasty decision, nor allow their Federal Councillors to be bulldozed into a decision which could adversely affect Australian Amateurs in the future. Remember the report is in the possession of Federal Councillors. Insist that it be produced at meetings, read and discussed FULLY, and only then make a decision.

—R. W. Higginbotham, VK3RN.

NEW NEW

AMATEUR TV TRANSMISSIONS

Vision Carrier Frequency
National Standard

426.25 MHz.

NEW NEW

VHF

Sub-Editor: ERIC JAMIESON, VK5LP
Forreston, South Australia, 5233.
Closing date for copy 30th of month.
All Times in E.S.T.

AMATEUR BAND BEACONS

VK0	53.544	VK0GR, Antarctia.
VK3	144.700	VK3VE, Vermont.
VK4	144.390	VK4VV, 107m. W of Brisbane.
VK5	53.000	VK5VF, Mt. Lofty
	144.800	VK5VF, Mt. Lofty
VK6	52.006	VK6VF, Tuart Hill
	53.900	VK6TS, Carnarvon.
	144.500	VK6VE, Mt. Barker
	145.010	VK6VF, Tuart Hill
	435.000	VK6VF (on by arrangement).
VK7	144.900	VK7VF, Devonport.
VK9	144.600	VK9XI, Christmas Island.
ZL2	145.200	ZL2VHF, Wellington.
ZL3	145.000	ZL3VHF, Christchurch.
JA	51.995	JA1IGY, Japan
W	50.091	WB6KAP, U.S.A.
HL	50.100	HL9WI, South Korea.
ZK	50.100	ZK1AA, Cook Island.
KH6	50.101	KH6EQI, Hawaii.
	50.015	KH6ERU, Hawaii

Not much change to the beacon list this month, although there are one or two things I am not happy about. There seems to be some confusion over the call sign of the VK0 beacon, it seems possible that it should be VK0PH, but there is nothing to confirm this. The frequencies of the two Hawaii beacons seem to be open to question, so will someone hearing them please advise me if changes are needed!

Mike VK3ASQ passes along the news that 6 metre activity in the Antarctic is not dead. Late in April Phil VK0PH on Casey Base worked a station on Macquarie Island, and believed to be the first VK0 to VK0 v.h.f. contact. Phil runs a continuous keyed c.w. beacon on 53.44 MHz. and tunes the band from 1900 to 2000 hours daily. On Monday, Wednesday and Friday he listens on 14.120 MHz. for reports or skeds.

It is well established that sporadic E conditions in the polar regions peak a few months later than for the mid-latitudes. As Macquarie Island is within single hop sporadic E distance of Tasmania and southern Victoria, there is some possibility of openings to VK0 at times.

Rod VK2ZQJ, ex-VK6ZSD, ex-VK6ZDS, and Wally VK5ZWW are getting into the headlines with quite regular working one another via random meteor scatter. Contacts take place between 0615 and 0645, this being the optimum period for random meteors. Received signals have varied from momentary pings to a 4½ minute steady signal. Wally now has VK3, 5 and 8 to his credit for such working, and has copied bits of VK4 but no formal contact. Other stations involved in MS work are VK8KK in Darwin, VK8AU Tennant Creek, VK6ZAA in Perth, VK4RO Ayr, and VK5ZDX Adelaide.

Interesting news of increased two metre activity around the Albury N.S.W. area. VK2RS runs a couple of hundred watts p.e.p. to a 16 element collinear up 100 feet on 144.300 MHz. VK2BWF runs 60 watts input to a QQE03/20 (I repeat, 60w.!) Both tune 2 metres from 2130 to 2135 most nights and call from 2135 to 2140. The path to Melbourne so far has proved quite reliable. VK3AJM in Wangaratta, 30 miles closer, is another in the area. VK2ZEO in Deniliquin also works into Melbourne, though at present activity is being directed towards Amateur t.v. in conjunction with VK3ZKU in Katunga, on 432 MHz.

Activity on 432 and 1296 MHz. seems to have been relatively quiet. However, we note that VK5UN (ex-VK7WF) is making his 1296 MHz. gear portable in readiness for the coming season's activities. If he and VK3AKC can make a contact on that band it will mean a further extension of the Australian record.

VK2ZTM, in a brief note which was missed previously, mentions a correction needed to the item on Repeaters in March "A.R." Sydney is Channel 4 and Central N.S.W. is Channel 1 in and Channel A out and later to be a complete channel 1 system. In the meantime, one might care to listen for the Sydney repeater which transmits its call sign VK2BWI/R1 in m.c.w. every five minutes as a beacon. Transmitting time is 23 seconds.

VK5ZDY at Stirling, high up in the Mt. Lofty Ranges, continues to make good use of his fine elevated site. A brief note refers to good signals being heard from VK3YEJ, VK3ZBN and VK3BJB, all at Mildura, on 11th May using Channel B f.m.

MEET THE OTHER MAN

Meet David VK8AU (ex-VK3ZAT, VK4AK, VK3AUU, VK3AAU), of Nobles Nob, Tennant Creek. First licensed in 1955, David moves around quite a bit judging by the various call signs. At present he is fully operational only on 52 MHz., running 400 watts p.e.p. from a pair of 572Bs into a 9 element Swan-type yagi at 25 feet. He uses an FTV650 transverter or VK3 V.h.f. Group converter for receiving. Tunable i.f. is a Drake 2B. He has a 15 element Swan-type yagi for 2 metres at present on the ground(!), while on 432 he has a 30 watt output capacity using a BAY96.

Whilst in VK3 on 52 MHz. he worked VK1 to 9 inclusive, ZL1, 2, 3 and 4 plus KH6 and JA. From the same area on 144 MHz. VK3, 5 and 7. While at Tennant Creek David has worked on 52 MHz., VK1, 2, 3, 4, 5, 7 and 8, JA, HL9 and KR6. I note also he worked VK7LZ on 288 MHz. while in VK3. He is a member of the W.I.A. and during 1960-61 was Sub-Editor for the V.h.f. page in "Amateur Radio". From Nobles Nob, 1150 feet above sea level, he has been interested in meteor scatter working and has a fairly constant path to Doug VK8KK in Darwin, a distance of 540 miles.

David is to return to VK3 later this year and hopes to become operational on 1296 MHz. for which he has a varactor tripler "half built". He also wants to "fiddle" with processing s.s.b. so that it can be multiplied from 144 MHz. instead of heterodyning, something which he says appears to be feasible. He is particularly interested in encouraging v.h.f. operators to endeavour to work greater than line of sight distances at all times, not just when conditions are good. With this in mind, he has sponsored a mid-winter contest during the month of July, details of which will be found in April issue of "A.R."

David concludes his information with the comment "Why do a lot of people use crummy receivers to feed their v.h.f. converters into, while they have good communications receivers for the h.f. bands? It's no wonder they can only work the station over the back fence."

Thought for the month: "While money isn't everything, it does keep you in touch with your children." Until next month, when my news will come to you while on holidays in Alice Springs. 73, Eric VK5LP. The Voice in the Hills.

VHF-UHF STATE RECORDS

MAY 1971

(N.B.—Australian records are in bold type)

MHz.		Date	Miles
	NEW SOUTH WALES		
50/52	VK2ADE to VE7AQQ	8/4/59	7320
144	VK3ATO/2 to ZL2HP	2/1/66	1456
432	VK4ZT/2 to VK4KE/4	12/7/69	219
576	No claim		
1296	AX4ZT/2 to AX4NO/4	12/4/70	250
	VICTORIA		
50/52	VK3ALZ to XE1FU	1/5/50	8418
144	VK3ZNC to ZL2HP	13/12/65	1873
432	VK3ALZ to VK5ZDR	28/5/66	402
576	VK3AKE to VK3ANW	11/12/49	80
1296	VK3AKC to VK7ZAH	17/2/71	273
2300	VK3XA to VK3ANW	18/3/50	9
3300	VK3ZGT/VK3ZGK/3 to VK3ZDQ/3	14/12/63	63
	QUEENSLAND		
50/52	VK4ZAZ to K6ERG	18/3/56	5305
144	VK4ZAZ to VK7ZAH	1/1/67	1157
432	VK4KE/4 to VK4ZT/2	12/7/69	219
576	No claim		
1296	AX4NO/2 to AX4ZT/2	12/4/70	250
	SOUTH AUSTRALIA		
50/52	VK5KL to W7ACS/KH6	26/6/47	5351
144	VK5BC to ZL2HP	29/12/65	1957
432	AX5ZKE to AX7ZRO/7	15/3/70	489
576	VK5ZJL/5 to VK5QZ/5	29/12/60	185
1296	VK5ZSD to VK3ZHU/5	28/9/69	75
	WESTERN AUSTRALIA		
50/52	VK6BE to JA6BP	30/10/58	5490
144	VK6KJ to VK5AOT	1/3/70	1517
432	VK6ZDS to VK6LK/6	25/4/66	66
576	VK6ZDS/6 to VK6LK/6	15/12/63	101
1296	No claim		
	TASMANIA		
50/52	VK7LZ to JA8IL	9/12/59	5462
144	VK7ZAH to VK4ZAZ	1/1/67	1187
432	AX7ZRO/7 to AX5ZKE	15/3/70	489
576	No claim		
1296	VK7ZAH to VK3AKC	17/2/71	273
	AUSTRALIAN E.M.E. RECORDS		
144	VK3ATN to K2MWA/2	23/11/66	10417
	AUSTRALIAN A.T.V. RECORDS		
432	VK5AO/T/P to VK5ZEF/T/P	16/8/69	93

DX

Sub-Editor: DON GRANTLEY
P.O. Box 222, Penrith, N.S.W., 2750
(All times in GMT)

As intimated previously, this will be the last batch of notes I will be preparing. The reasons are purely personal, and there is a good possibility that I will return to the game in a few years time, probably with a full call. In the meantime I would like to thank those who have consistently assisted me in what has not been an easy task and trust that you will support the new scribe. The address for all future notes will be: The Editor "A.R." P.O. Box 36, East Melbourne, Vic., 3002.

A letter to hand from ardent S.w.l., Ernie Luft, in Elizabeth, S.A., told me he has received JY1/King Hussein's card at last, also one from TA3GP in the same mail. Ernie reports a good signal from ET3ZU/A on Zukar Is., who says QSL to I1IJ.

Whilst on the subject of VK5, I have a welcome letter from Bill VK5WV with further details of VK0 activity. Bill is manager for Ken VK0IN during his stay on Mawson, which should be till about February 1972. Address is Mr. Bill Verrall, 7 Lilac Ave., Flinders Park, S.A., 5025.

Bill tells me the gear at Mawson belongs to Col VK0CC and is as recently described in this column. Other activity from the same shack is by Keith VK0MX. John VK0JM has been active from Casey on 20 metres, whilst Fred VK0TM works from Macquarie.

The following information to hand from Noel VK3AHH at Kempsey. Africans are coming through via the long path from 0600z to 0730z including TJ1AW 9U5DS, CR6KT, CR7AC CN8CG CT3AN, 5J2DA, 5N2AAN, also 9G1GT (Ron Taylor, Box 1914, Accra, Ghana), PJ7JC (J. Clintje, C/o. LRTD, St. Maarten), LZ1KAA Box 1133, Sofia), FG7GC (Box 321, Pointeapitre, Guadeloupe), TU2DB (D. Budet, Box 1850, Abidjan, Ivory Coast), and 7P8AB (Dr. A. Jaques, Box 388, Maseru, Lesotho. Noel also advises that UK2FAD who is often about the bands at around 0600z, is a good catch as he is in Kaliningradsk HC8FN is often on 21 at around 0130, as are some KZ5s and KP4s, whilst on 14 MHz. OD5ET (1100z), HK0BKX (0615) and VP9DL at 0600z are worth looking for.

From John VK4QA I note that JY1, who has been news for a long time in Amateur circles and is not always easy to catch, has now shown up in the Pacific DX Net. Together with 9H1BX on Malta, and KW6AA, Box 61, Wake Island, John managed to hook him.

Firstly, as I start on the overseas DX news sheets, we have some recent prefixes, all valid only for prefix hunters unless stated otherwise. FG0MH and FS0MH were WB8ABN/F0MH operating from the FG7 area and later from FS7 during April. The I2 prefix was used by several Italian stations recently, but no reason is stated. JY8AA and JY9AB is our friend Mary Anne WA3HUP and Charlie W3GE, their two weeks' jaunt should be completed by now. OG2A was used for the WPX contest by some OHs as part of the SRAL's 50th anniversary. QSLs for all these to OH2BAD. OI1VR was used during the same event, and is OH1VR.

Still on prefixes, but a very interesting trio are TA3GB with QSL manager W2FXA; also TA3HC, TA3KE who is TA3GB's XYL, TA3JD (manager DL8ZB) and the TC3CH contest operation (QSLs go to LA3UF)

MP4TDM, the only station in the Shiekdom of Ras-al-Khaima, has a sked with GW3AHN every Friday at 1830z on 14280. His QSL manager is K1DRN, or cards can go direct to Box 151, Ras al-Khaima, Trucial States. MP4MBC is on quite regularly from Masirah Is., and cards should go to his home QTH where he is G3XEC

Raymond Marti, ex-F1ASI, is now signing TR8MR and often heard during the period from 1300 to 2300z. Manager is VE3DCY, and the home address is C/o. S.E.E.G., B.P. Libreville, Republic of Gabon. In the same general area we note that TT8AD QRV daily on 14235 at 0600, and 21226 at 1130, also if conditions are good he will be on 28625 at 0800. TT8AC has a sked with W4SPX 14290 Sundays at 0430, whilst TT8AF is now back home as F2HF

Looking for Wyoming for W.A.S.? WA7IFX (Jim) is active on all bands, with a preference for 14/21 on either mode. He is on the air from 0300-0700 and 1300 to 1530z.

VR1U has been worked of late. He is VR3EY who makes an occasional visit to that location as there is no resident operator there. Reported contact was made at 0448 on 14240.

Several stations are active from JT in Zone 23, they are JT1AH, JT1KAA, JT2AB, JT3KAA, UA9VH/JT1, the latter being on s.s.b., the others on c.w., and whenever I have heard them they have rough notes. Box 639, Ulan, Bator, seems to be the most likely venue for a QSL which will be notoriously slow, but will eventuate. Mine was sent via Box 88, Moscow and returned via the bureau.

KB6CT has been working between 0600 and 0800 quite regularly, in many cases with ZL2ASJ or ZL4NH assisting. The reported channel is 14265, and QSLs for operators Art, Bill and Jim go to Federal Elect Corporation, A.P.O. San Francisco, Calif., 96401, U.S.A.

QSLs for the operation of KJ6CF from Johnson Is. between Aug. 21 and Sept. 21, 1970, can be sent to Don at his present address, which is Don Pierce, 3600 51st Loop, Sandia Base, New Mexico, 87116, U.S.A. Other recent operations from the Pacific included KM6DX. QSL manager is W7PHO, and KX6IL whose manager is WA3OYY

The St. Lucia Amateur Radio Club were scheduled to operate from VP2LDD on 1st and 2nd May using all bands. There is only one report of the operation being worked, but I believe the QSLs were to be handled by VP2LT

VR5DK, who has been operating from that QTH for some time now, has returned to ZL. The operator's name is Darleen and QSL manager is now VE6AKV. VR5LT is fairly active from Tonga.

Graham ZL4AX is now active from Ross Is. and often works into this country. He asks for QSLs to be sent to ZL1SV, but via the N.Z.A.R.T. Usual period of activity is anywhere between 0700 and 0800z. ZM7AG is also active working into the States.

The gentlemen of the British Commonwealth Net are now on their summer QRG, 21364 s.s.b. at 1430 daily. G3LQP is net control with VS9MB, ZB2A, MP4s, 9H, 9M2, 9V and many other interesting calls. Personally, at that time of the night I would prefer sleep, but strangely enough 15 metres does come to life at odd hours like this when we in VK show a disinclination to detach ourselves from a nice warm bed.

Recent successful operation by Aldo ET3ZU/A from Zuqar Is., situated in a channel between Ethiopa and Yemen, has resulted in this fine operator's decision to return there at a later date. I1LJ is the QSL manager for the completed operation which drew some praise from the Long Is. DX Assn. for the good operating, and some caustic comments directed at some of the smart types who tried to interfere with the fine efforts of the operator concerned.

It is a pity that these stupid types, and that is only a very mild description of them, should always try time and time again to interfere with the efforts of somebody who is doing their best to provide an interesting contact for so many of his fellow Amateurs. They have not neither the brains nor the ability to do something constructive for the Amateur movement. Possibly they are not licensed, and on reflection this is most likely the case. And while on the subject, it would not do Amateur Radio any harm if the Radio Branch had a good look over the bands around the time of our broadcasts, particularly in the evenings.

SOME QTHs

The following lists are taken from a recent copy of "Monitor," the monthly magazine of the ISWL, to whom we are indebted for much of the assistance which I have been obtaining over the past years, both with the DX News and the now defunct SWL notes.

CX4CR—Mario Rebufello, Punongos, 2480-bis Montevideo, Uruguay
DK2NU—Josef Muller, Bei der Muhle 8, D-3011 Laatzen, W. Germany.
EP2JP—Jamshid Partovi-Nejad, Box 1000, Armish-Maag, A.P.O. New York, 09205, U.S.
EP3WB—Wolfgang Bauer, Box 3421, Teheran, Iran
FH8CG—B.P 136, Moroni, Comore Is., Africa.
FM7AB—Jean-Pierre Viode, Observatoire de la Martinique, Martinique, French West Indies
FR7AI/T—B.P 4. St Clotilde, Ile de la Reunion, Indian Ocean.
FY7AE—Cesar Moyal, B.P 486, Kourou, French Guiana, Sth. America.
I1JX—Antonio Vernucci, via R. Lanciani 38, 00162, Rome
JA0CUV/1—Tack Kumagai, Box 22, Mitaka, Tokyo.
KG6JAC—Box 6125, Merizo, Guam, 96910.
KR6IL—Det 1-2132 Comm. Sqdn., A.P.O., San Francisco, C.A. 96235.
KW6GJ—W. Smith, Box 553, Wake Is., 96930.
OK3HM—J. Horsky, Krajinska 3030, Piestany, Czechoslovakia.
PJ2HT—Box 878, Curacao, Neth. Antillies, Sth. America.
VK9AC—Box 5122, Boroko, Papua.
VP2AAP—Fred Perkins, C/o. Antigua A.S., Box 4157, Patrick A.F.B., Florida, U.S.A.
VP8LV—Box 177, Pt. Stanley, Falkland Is.
VQ9TF—Box 4, Mahe, Seychelles, Indian Ocean.
VQ9W—Box 234, Victoria, Mahe, Seychelles.
VR4CG—George Cruickshank, Box 310, Honiara, Solomon Is.
VR4EN—Box 332, Honiara, Solomon Is.
W3HNK—J Arcure, Box 14, Norwood, Penna, 19074, U.S.A.
W7TE—Eugene Farley, 1418 Federal Way, Salt Lake City, Utah, 84102, U.S.A.
XT2AA—Jacques Feyssac, B.P. 75, Ouagadougou, Upper Volta Rep.
YB3AAI—Box 37, Surabaja, Java, Indonesia.
5H3MV—Gordon Davis, Box 23080, Oyster Bay, Dar-es-Salaam, Tanzania.
5R8AP—Ishmael Mason, N.A.S.A., Box 3342, Tanarive, Malgassy Rep.
9G1DY—Box 2949, Accra, West Africa.

QSL MANAGERS

HC8FN to WA5WUV	TR8VW to DK2NU
HC8RF to HC1RF	TU2CK to W4VPD
HR3GX to VE1ASJ	TY0ABC to DJ6QT
JD1YAA to JA1WU	TY0ABD to DJ6QT
KG6JAC to DJ8ZB	VS9MB to G3KDB
KG6SI to WA6AHF	XT2AA to K3RLY
KZ5EE to K1ZMQ	XT2AB to DJ1QP
MP4BHH to K4MQG	XT2AC to DJ6QT
OA3Y to SM0FO	ZD3D to VE3DCY
OH0AA to OH0NI	ZD3N to DJ1QP
PJ0FC to W1FJJ	ZD3P to DJ6QT
TA1TS to WA6ETC	ZD8X to WA8LEV
TA3HC to LA3UF	

That is all for another month, and for me the final issue. I would thank those who have supported me over the past couple of years and sincerely urge as many of our readers from this country to support the new sub-editor. As I have often intimated, supply of notes from overseas news sheets depends entirely on our ability to supply them with information no matter how unimportant it may seem. With an increase in postal charges looming in the very near future in the U.K., the Geoff Watts DX news sheet, which is probably the most comprehensive in the world, is no longer available to us on the free list, so this will mean that we shall have to hunt harder for news. Many thanks by the way to Geoff for his help in the past and if any individual cares to subscribe to his weekly news sheet, the procedure is simple. His address is Geoff Watts, 62 Belmore Rd., Norwich NR 73-T, England. The sheet is a single foolscap duplicated sheet, printed with very fine type, the average copy contains details on around 30 call areas, frequencies, times are given where known, also full QSL information. Cost is three pounds sterling for 57 issues, two pounds for 38 issues, and 19 issues can be obtained for one pound sterling. The latter would be ideal for anybody wanting to try it out. All issues are mailed by airmail from the U.K., and arrive here about four days after issue. 73, de Don VK2/2003.

One or two additional notes to Don's DX news by HF Evertick.

Darleen Souligny, ex VR5DK, operated as ZL1ATC from Huntley and from Jack ZL1BL's QTH in May and early June. Her itinerary from June 8 was to be Melbourne, Perth and Mauritius (contact via 3B8CR) to Rodrigues Is. for a six-weeks' stay from about June 16. Thereafter she plans a safari into East Africa and, subject to licensing, hopes to operate from 5X5 and 5Z4. She may call into Dares Salaam to contact Garth 5H3LV, but any chances of obtaining a Zanzibar call seem remote as Garth himself, in securing his 5H1LV licence, had many problems to surmount. Darleen's QSL manager for her DX-peditioning is VE6AKV and her home call is WA6PSC

Further news about Larry Pace's (K2IXP) DX-pedition to Willis Is. and Mellish Reef (mentioned in June "A.R.") indicates a merry party of travellers with him including VK7AZ (boat owner), VK2SG, VK3AJW, VK4FJ and VK4XY. We wish the party success and a safe voyage.

Both these DX-peditions are purely private ventures worthy of support. Another DX-pedition in June, much in demand stateside, was FR7ZL/E from Europa Is. and possibly FR7ZD/T on Tromelin.

BUNYIP TALK

HOW WOULD IT BE TO HAVE THE CW SEGMENTS AT THE OTHER ENDS OF THE H.F BANDS?

Overseas Magazine Review

Compiled by Syd Clark, VK3ASC and R. L. Gunther, VK7RG

ASIAN BROADCASTING UNION TECHNICAL REVIEW

March 1971, Issue No. 13—

Keep Track of those R.F. Power Tubes, Pat Finnegan, Station WLBC (U.S.A.). Of interest to all who want to get most life from transmitting valves. Also covers in different wording part of "A.R's" lecture series No. 10 on Harmonics.

Radio Wave Propagation, a Kinase of Nippon Hoso Kyokai (Japan). Makes good reading to go with VK3ACA's excellent series on "Home Station Antenna for 160 Metres". Also covers in more detail the section on propagation in Lecture No. 1, "A.R.," January 1970.

The A.B.U. Review might not be readily available, but it should be possible to borrow a copy from a broadcasting station in most parts of the world, other than some parts of Africa and South America, as a great number of broadcasting organisations are members or associates of the A.B.U. —VK3AXU.

HAM RADIO MAGAZINE

March 1971—

Phase-Locked Local Oscillator, VE5FP. A phase-locked local oscillator is described in full detail, covering 14 to 50 MHz. This is part of the coverage of phase-locked systems which is receiving so much attention in Amateur circles in these times.

TR-50 Customised Six Metre Transverter, by K1RAK. The mixer-driver involves only three valves (push-pull 6763s in output), with a 4X150 linear p.a. The system is driven at 14 MHz. A receiving converter achieves a good noise figure with a single and dual gate FET combination.

RTTY Signal Generator, W7ZTC. MC-890-P and MC-824-P ICs are used as an r.t.t.y. reversal generator to produce an ryryry signal for testing teleprinters.

Tabulated Characteristics of Vacuum-Tube and Transistor Amplifiers, W5JJ. A clear, thorough, and most valuable tabulation of the essential characteristics of Class A, B and C amplifiers of these two kinds of devices. W5JJ points out, among much else, a fact which seems to have confused numerous authors of articles using transistors: Class B operation is defined for transistors exactly as for valves. The base is biased so that the collector is just short of cut-off, and collector current flows for about 180 degrees of each input signal cycle. An unbiased transistor is, therefore, operating in Class C, not Class B, because of the natural offset provided by the base-emitter junction threshold! To achieve Class B operation with a transistor, it has to have a bit of forward bias until the abovementioned conditions are achieved.

Plain Talk About Repeater Problems, by VE7ABK. Various solutions are presented to the intermodulation and desensitisation problems commonly faced in repeater operation. Among other things, intermodulation can be reduced by using bandpass or band-reject cavity filters tuned to the interfering signal.

The Cordover Audio Oscillator Module, by WB2GQY. "Introducing a completely assembled circuit board that has many Amateur applications—for less than a dollar!" Two transistors connected in the garden-variety regenerative-switch mode (collector to base, each). It is supposed to feature a 5-watt output transistor, but since a heat sink can't be attached to the module, you are no worse off using two computer board transistors—and cheaper. Herein lies a moral: a commercially-assembled piece of stuff is not necessarily better (or cheaper) just because someone else has put the wires together.

Rating Tubes for Linear Amplifier Service, W6UOV. Again Eimac provide competent technical information to assist consumers in the best selection of their products. Here, peak envelope power and intermodulation distortion are measured and evaluated. No reason why these methods shouldn't be applied to any valves. Noteworthy is the fact that maximum IM distortion does not necessarily occur at maximum drive; IM in fact passes through various maxima and minima.

The Repair Bench, L. Allen. How to use a sweep and markers to tune i.f.'s. Good.

New Products. Various commercial items of moderate interest, but quite a good announcement about the availability of a "QRPP Magazine", published by K8EEG, titled "The Milliwatt". Includes construction projects, technical articles, operating news, etc. Published six times per year for $US3.00 annually; W. Mattox, K8EIL/2, 115 Park Ave., Binghamton, New York 13903, U.S.A.

O.H.M. (The Oriental Ham Magazine)

February 1971—

For those Amateurs who are keen to keep in touch with what is happening in the Far East and especially in the British Crown Colony of Hong Kong, this newsy little magazine will do the job. In this issue they talk about a DX-pedition to Spratly where Dick Bartlett was to go in April.

There is an "Intruder Report" on page 7 which lists a number of stations which are supposed to be elsewhere in the spectrum.

Rarts on Two Metres. Stan VS6FE describes a mobile rally held recently on that band in Hong Kong and the fun that was had by all.

QST

April 1971—

A Transmatch for Field Day, W1KLK. Here is an easy to build Transmatch that will permit any antenna feed line, balanced or unbalanced, to be matched to that 50 or 75 ohm unbalanced transmitter output.

The Digital Message Generator with RTTY, K1KLP. Another one for the baud-ists.

Digital Filters, ZL2AVF. Seems like another device which will find its way into some Amateur rigs, perhaps to narrow the bandpass for c.w. Probably to pass the two (mark and space) tone frequencies used in r.t.t.y.

The Down-to-earth "Sky Hook", W3HVE describes how he overcame his tilt-over mast problems. All materials are commonly available in Australia and there should be no difficulty in duplicating the design. The concrete counterweight is a useful "gimmick". I have seen another type in VK3 which used four gallon oil drums filled with an appropriate quantity of water.

The Five Finger Keyer, W2IMU. Working on the assumption that the more of the hand you use the better and faster it can send Morse Code. One man's meat, etc.

Simplified Antenna Switching, W1ICP. A simple method, particularly suited to the needs of the newcomer to Amateur Radio. The relay is an s.p.d.t. type.

A 2.3 GHz. Crystal Controlled Converter, by W4HHK. A practical idea for narrow band u.h.f. reception.

Receiving F.M., Part IV., W1KLK. Basic principles and new circuits.

Husky Power Supply for Sweep Tube Amplifiers, W1CER. Take one transformer rated at 900-0-900v, 700 mA., full wave rectifier, and feed to a filter consisting of 3 x 330 uF electros in series and bingo—you have 900v. at ½ amp. continuous/over 1 amp. s.s.b. rating.

The Two Metre Eggbeater, WA2PTS. Polarisation is stated to be no problem to this omni-directional antenna using two full wave loops.

The Lafayette HA-750 6 Metre Transceiver. Review by W1HDQ.

Polydimensional C.W., W6MUR. Defined by the author as "The Ultimate Solution to C.w. QRM". You'll need to read it yourself to see whether or not it is a "have-on". Stated to be a system recently "de-classified by the U.S. Government".

Modern Ham Jargon Defined, W1RGL. An old theme in new guise.

RADIO ZS

April 1971—

Tuning the VHF and UHF Spectrum, ZS2FM. An article designed to show newcomers how they can go about making the most use of these bands.

Indexing Systems. ZS6ACK describes some methods of indexing the QSOs you conduct and the QSLs sent out so that you do not waste money duplicating some of them.

Captain Alsar, HC9EBP, Makes An Incredible Voyage. VK4SS tells the story of the incredible journey of the raft "La Balsa".

Fifty Years of Amateur Radio. Eddie ZS1DH describes the days when "Amateurs" could not be Amateurs without being builders and they all rolled their own from raw materials. It seems that when he began in 1920 there were no radio retailers, wholesalers or manufacturers.

In the same issue is an "insert" describing a **New, Solid State Receiver**, covering the range 0.5-30 MHz., which will receive a.m., c.w., s.s.b. type signals with i.f. bandwidths of 6 and 3 KHz. called the "Barlow-Wadley XCR-30 Receiver". Performance is stated to be quite outstanding for a price of R297 and in a box 11½ x 7½ x 4 inches, operating from six dry cells.

NEW CALL SIGNS

FEBRUARY 1971

VK2CG—L. K. Phillips, 179 Trongate St., Granville, 2142.
VK2TR—R. A. J. Taylor, Station: Bay St., Tathra, 2550; Postal: P.O. Box 328, Bega, 2550.
VK2ATQ/T—R. A. Cameron, 6 Cottrell Pl., Baulkham Hills, 2153.
VK2BCQ—D. Charlton, 30 Barcoo Island, Sylvania Waters, 2224.
VK3JT—W. B. Magnusson, 359 Williamstown Rd., Yarraville, 3013.
VK3LW—A. B. Bradley, 22 Langdon St., Portarlington, 3223.
VK3NU/T—R. G. Thomas, 35 Crow St., East Burwood, 3151.
VK3ZD—K. J. Horan, 34 Roberts St., Glen Waverley, 3150.
VK3AJV—R. E. Durrant, 330 Burwood H'way, Burwood, 3125.
VK3AQU—I. N. Glanville, 1 Speed St., Ararat, 3377.
VK3BEZ—Wireless Institute of Australia (Eastern Zone), Station: Mt. Tassie; Postal: P.O. Box 175, Maffra, 3860. (Later changed to VK3WI/R3.)
VK3BFB—Geelong Amateur Radio Translator Group, Station: "Bayview," Haines Rd., Gnarwarre; Postal: 5 Kyle Ave., Belmont, 3216. (Later changed to VK-3BGL/R2.)
VK3BFD—A. A. George, 3/5 South Ave., Moorabbin, 3189.
VK3BFE—R. C. McPhee, 4 Frederick St., Balwyn, 3103.
VK3YFG—D. W. Edwards, 92 South Valley Rd., Highton, 3216.
VK3YFH—G. W. Gulley, 155 Melbourne Rd., North Geelong, 3215.
VK3YFJ—P. G. Niehoff, 109 Victoria Rd., Northcote, 3070.
VK3YFS—N. Spano, 3 Seaholme Ave., Seaholme, 3018.
VK3ZPX—P. G. Waterhouse, 4/76 Barton St., Reservoir, 3073.
VK3ZZD—D. K. Morgan, 18 Iris Ave., Wendouree, 3355.
VK4OD—E. O. K. Phillips, Dixons Rd., Buderim, 4556.
VK4QZ—D. L. Leonard, 30 Canopus Circuit, Atherton, 4883.
VK4YM—W. D. Mather, 23 Paradise Is., Surfers Paradise, 4217.
VK4ZGG—G. K. Gold, 62 Tarragindi Rd., Annerley, 4103.
VK4ZRY—R. W. Young (Dr.), 7 Boblynne St., Chapel Hill, 4069.
VK5SZ—R. G. Gibson, Station: O.T.C. Cottage No. 10, Lambett St., Ceduna, 5690; Postal: C/o. O.T.C. Satellite Station, Ceduna, 5690.
VK5UG—J. M. Hansen, P.O. Box 445, Woomera, 5720.
VK5ZHS—H. J. Sipols, 231 Victoria Rd., Largs Bay, 5016.
VK6CX—R. A. Bee, 2 Marion Rd., Amelia Heights, 6020.
VK6GE—G. Cole, 125 King St., Boulder, 6432.
VK7ZGW—G. A. W. Wood, 8 Norwood Ave., Launceston, 7250.
VK8VF—Darwin Radio Club Inc., Club House Building, No. 121, East Point Reserve, Darwin, 5790. (Beacon)
VK8ZTH—R. M. Hester, 33 Roberts Cres., Alice Springs, 5750.
VK9AT—W. D. Batty, Station: Lot 1, Section 4, Minihi Ave., Boroko, P.; Postal: C/o. P.O. Box 56, Port Moresby, P.
VK9DV—D. Van Nortwick, Station: Ukarumpa; Postal: C/o. P.O. Box 191, Ukarumpa, E.H.D., N.G.
VK9HL—R. R. Hooper, Station: Poinciana Ave., Lae, N.G.; Postal: P.O. Box 251, Lae, N.G.
VK9KJ—K. L. Finney, Station: Musgrave St., Port Moresby, P.; Postal: P.O. Box 3155, Port Moresby, P.
VK9ZAF—J. R. Beaumont, Station: Ukarumpa, N.G.; Postal: P.O. Box 191, Ukarumpa, E.H.D., N.G.
VK9ZAP—R. Pearson, Station: Section 37, Lot 6, Mavaru St., Boroko, P.; Postal: C/o. P.O. Box 2087, Konedobu, P.
VK9ZEN—E. M. Norris, Station: Section 34, Lot 21, Allamanda Cres., Madang, N.G.; Postal: P.O. Box 586, Madang, N.G.
VK0ZPO—C. L. Scally, Mawson, Antarctica.

CANCELLATIONS

VK2JD—J. Davis. Not renewed.
VK2JO—R. C. Caldwell. Not renewed.
VK2NE—H. M. Bone. Transferred to Qld.
VK2OY—J. C. A. Young. Transferred to Qld.
VK2PG—J. H. Gore. Transferred to A.C.T.
VK2AEJ—J. W. Smith. Not renewed.
VK2ANI—U. N. Fierz. Not renewed.
VK2AOZ—L. H. Ferris. Not renewed.
VK2AVP—H. A. Perkins. Not renewed.
VK2BAB—K. S. Mullan. Not renewed.
VK2BCS—C. C. Talbert. Not renewed.
VK2BHM—H. B. Milburn. Not renewed.
VK2BJP—J. K. Olsen. Not renewed.
VK2BPP—N. L. Pinkerton. Deceased.
VK2BSM—S. T. Marr. Not renewed.
VK2ZBN—J. Bracken. Not renewed.
VK2ZEN—E. M. Norris. Now VK9ZEN.
VK2ZFL—J. Lak. Not renewed.
VK2ZKP—L. K. Phillips. Now VK2CG.
VK2ZRV—F. R. Forrester. Not renewed.
VK2ZTQ—R. A. Cameron. Now VK2ATQ/T.
VK3ACM—C. A. McKenzie. Not renewed.
VK3ADC—D. Charlton. Now VK2BCQ.
VK3AEK—E. J. Bayliss. Not renewed.
VK3AGR—R. G. J. Horne. Not renewed.
VK3AHT—W. B. Magnusson. Now VK3JT.
VK3AID—F. C. Hutton. Transferred to Qld.
VK3AXB—J. Linden. Transferred to N.S.W.
VK3BAS/T—R. G. Thomas. Now VK3NU/T.
VK3BBU—P. B. Parry. Not renewed.
VK3BDC—B. A. Cook. Transferred to W.A.
VK3BDJ—D. J. Bainbridge. Not renewed.
VK3BDQ—J. K. Horan. Now VK3ZD.
VK3YAF—J. R. Beaumont. Now VK9ZAF.
VK3YAM—P. R. Maher. Deceased.
VK3ZGJ—G. J. Champion. Not renewed.
VK3ZJT—E. M. Timms (Mrs.). Not renewed.
VK3ZMM—I. W. Cerchi. Not renewed.
VK3ZPW—P. J. Wright. Not renewed.
VK3ZQO—A. B. Bradley. Now VK3LW.
VK3ZRL—R. W. Nash (Major). Transferred to N.S.W.
VK3ZTR—T. R. Chappel. Deceased.
VK3ZWQ—D. S. McQuie. Not renewed.
VK4RA—R. A. Stephens. Not renewed.
VK4RQ—H. C. Noble. Not renewed.
VK4RR—K. W. Beale. Not renewed.
VK4YU—D. Dawson. Not renewed.
VK4ZRP—R. Pearson. Now VK9ZAP.
VK5ZLC—C. R. Ludewig. Transferred to Port Moresby.
VK6AS—A. A. Smith. Not renewed.
VK6LI—W. F. Cashwell. Left country.
VK6NR—N. Cooper. Not renewed.
VK6WS—W. Schofield. Not renewed.
VK7GC—A. H. Sandilands. Transferred to N.S.W.
VK7WF/T—W. J. Emmett. Transferred to S.A.
VK8JH—J. L. Hester. Not renewed.
VK9AU—S. A. Sibley. Returned to Mainland.
VK9HS—N. E. Parsons. Returned to Mainland.

LICENSED AMATEURS IN VK

FEBRUARY 1971

	Full	Lim.	Total
VK0	11	1	12
VK1	82	28	110
VK2	1387	460	1847
VK3	1314	650	1964
VK4	522	199	721
VK5	530	234	764
VK6	362	137	499
VK7	160	69	229
VK8	37	14	51
VK9	91	10	101
Grand Total	4496	1802	6298

THE IMAGE PROBLEM

I attended a scientific conference recently and was sitting there listening to the usual conference fare—good papers poorly presented and the converse—when I was treated to something a bit out of the ordinary. One speaker described a propagation experiment which involved a rather elaborate antenna and receiving system. The transmitter, however, was an Amateur station, and the speaker pointed this out two or three times in his presentation—almost as if he were proud of the fact! The contrast of this attitude with that which existed a few years ago is remarkable. The Amateur has been regarded for years as a technician or hobbyist with no real capability for contributing to science, at least by many scientists. At the university I recently graduated from, some electrical engineering faculty members for years didn't admit to being Hams, because of the potential stigma it carried. As for using Amateur Radio in research experiments—it just wasn't done.

So what's the point? Well, the image of the Amateur is changing in the scientific community. Credit for the change belongs, in large part, to the Amateurs in A.M.S.A.T.; in project Moonray; and to those in the scientific community who are actively using Amateur Radio in their research work. Many of them, it is interesting to note, use Amateur gear because the big budget slash has them operating on a shoe-string (in the best ham tradition!). The change is a freshing, needed, and long overdue one.

Helping to push the change are people like D. T. Bellair, of the University of Melbourne. He has written a paper titled "Disturbances to Trans-Ionospheric Propagation at 29.45 MHz. Observed using the Australis-Oscar 5 Satellite". The paper deserves publication in a scientific journal; it represents a worthwhile contribution to ionospheric radio propagation research. Of course, I admit to being a bit biased about his paper; like the gentleman at the scientific conference, Bellair is quite proud of the fact that his results were obtained with the help of Amateurs.

—Reprinted from A.M.S.A.T. Newsletter, Vol. 3, No. 1, March 1971.

WATER-COOLED MICROPHONE

To a Canadian must go the honour of being the first to broadcast speech and music. This was as long ago as 1906, when Professor R. A. Fessenden, working in the U.S.A. transmitted a short programme on Christmas Eve of that year from Brant Rock, Massachusetts. His transmitter was a 50 KHz. alternator, modulated by a water-cooled microphone.

—Origin unknown.

FEDERAL AWARDS

AUSTRALIAN D.X.C.C. COUNTRIES LIST AMENDMENT

Deletion: 9K3/8Z5 Kuwait/Saudi Arabia Neutral Zone. Only contacts made prior to 18/12/69 will be credited.

All D.X.C.C. members who have claimed Kuwait/Saudi Arabia Neutral Zone have had their scores amended as necessary.

COOK BI-CENTENARY AWARD

The following additional stations have qualified for the Award:

Cert. No.	Call	Cert. No.	Call	Cert. No.	Call
1338	VE4FU	1344	G3YV	1350	ON5KD
1339	AX3AMO	1345	AX3VJ	1351	WB6VZI
1340	SP6ABE	1346	AX2BMI	1352	G5FH
1341	ZE2KV	1347	3Z8AG	1353	JA2EG
1342	ZL3RP	1348	WB0AAT/KR6AQ	1354	ZL1HD
1343	AX2SI	1349	CR7FR	1355	AX6TU

V.H.F./U.H.F. Section

Cert. No.	Call
27	AX2ZVF

— . . . . —

Results of 2nd "World Rtty Championship" 1971

The table shows the points obtained in the five contests which were taken into account. The final placing is given by the best four scores out of five possible.

No.	Call	BARTG Spring	DARC WAE	RTTY DX S'stakes	A. Volta RTTY	Giant Flash	Total Points
1.	I1KG	30	30	25	30	30	120
2.	VK2FZ	20	30	30	—	—	80
3.	I1CGE	13	22	18	20	—	73
4.	I1CAQ	15	—	10	22	22	69
5.	WA2YVK	1	18	1	25	30	64
6.	W4YG	16	—	7	12	25	60
7.	VE7UBC	17	25	5	—	12	59
8.	VK3DM	1	22	8	9	16	55
9.	VE2LO/W6	—	30	14	—	—	44
10.	FO8BS	—	—	20	13	8	41

VK2EG finished 73rd with 5 points, whilst VK3KF finished in 169th position.

17th EUROPEAN (WAE) DX CONTEST

The Deutscher Amateur Radio Club (DARC) has the honour to invite Amateurs all over the world to participate in the 17th WAE DX Contest 1971.

Contest periods: C.W.—0000 GMT Saturday, Aug 7 to 2400 GMT Sunday, Aug. 8. Phone—0000 GMT Saturday, Sept. 11, to 2400 GMT Sunday, Sept. 12.

Bands: All bands 3.5 through 28 MHz.

Classifications: Single operator, all bands; multi-operator, single transmitter.

Rest period: Only 36 hours of operation out of the 48 hours are permitted for single operator stations. The 12 hours of non operation may be taken in one, but not more than three periods any time during the contest.

Exchange: A contest QSO can only be established between a non-European and a European station. The usual five or six digit serial number RST/RS report plus a progressive QSO number starting with 001.

Points: Each QSO will count 1 point, except on 3.5 MHz. where it will count 2 points. A station may be worked once per band. Each confirmed QIC—given or received—counts 1 point.

Multipliers: The multiplier for non-European stations is determined by the number of European countries worked on each band. Europeans will use the latest A.R.R.L. countries list. In addition, each call area in the following countries will be considered a multiplier: JA, PY, VE, VO, VK, W/K, ZL, ZS, UA9/0. The multiplier on 3.5 MHz. may be multiplied by three. The multiplier on 7 MHz. may be multiplied by two.

Scoring: The final score is the total QSO points multiplied by the sum total multipliers from all bands.

QTC-Traffic: Additional point credit can be realised by making use of the QTC traffic feature. A QTC is a report of a confirmed QSO that has taken place earlier in the contest and later sent back to a European station. It can only be sent from a non-European station to a European station. The general idea being that after a number of European stations have been worked, a list of these stations can be reported back during a QSO with another station. An additional 1 point credit can be claimed for each station reported.

(a) A QTC contains the time, call and QSO number of the station being reported, i.e. 1300/DJ3KR/134. This means that at 1300 GMT you worked DJ3KR and received number 134.

(b) A QSO can be reported only once and not back to the original station.

(c) Only a maximum of 10 QTCs to a station per band is permitted. You may work the same station several times to complete this quota. Only the original contact, however, has QSO point value.

(d) Keep a uniform list of QTCs sent. QTC 3/7 indicates that this is the 3rd series of QTCs sent and that 7 QSOs are reported.

Contest Awards: Certificates to highest scorer in each classification in each country. Continental leaders will be honoured. Certificates will also be given to stations with at least half the score of the continental leader. Newcomers (single operator participants holding their first licence less than one year) will receive a certificate when scoring 10 per cent. of the continental leader.

Disqualification: Violation of the rules of this contest, or unsportsmanlike conduct, or taking credit for excessive duplicate contacts will be deemed sufficient cause for disqualification. The decisions of the Contest Committee are final.

Logs: It is suggested to use the log sheets of the DARC or equivalent. Send large size s.a.s.e. to get the wanted number of log and summary sheets (40 QSOs or QTCs per sheet). Use a separate log for each band.

Deadline: C.W.—Sept. 15; Phone—Oct. 15.

Mailing Address: WAEDC Committee, D-895 Kaufbeuren, Postbox 262, Germany.

SILENT KEYS

It is with deep regret that we record the passing of—

VK4EU—Dale West.
VK4GZ—Esmond Waddle
VK4HR—Harry Scholz

ANTARCTICA RESEARCH

The W.I.A. has been requested to assist in current scientific discussions about propagation into, out of, through, or via Antarctica. It appears that there is a lot of scientific knowledge stored away in individuals' minds or log books but not brought together for general discussion and application. So, next May a Symposium on technical and scientific problems affecting Antarctic Telecommunications is proposed to be held in Norway.

Has anybody any knowledge, experience or odd items of information to contribute to this subject of Antarctica? If so, please write it down and send it in as early as possible to Federal Executive, W.I.A., P.O. Box 67, East Melbourne, Vic., 3002. Thank you.

—VK3CIF.

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